LIVINGSTONE-PORCUPINE HILLS

Sub-Regional Integrated Resource Plan

Alberta

LIVINGSTONE-PORCUPINE HILLS

SUB-REGIONAL

INTEGRATED RESOURCE PLAN

Approved by the Economic Planning
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PREFACE

This planning document was prepared by government agencies and public consultants in recognition of the need for improved management of Alberta's lands and resources. It applies only to public lands within the Livingstone-Porcupine Hills planning area, not to private or federal lands.

The plan presents the Government of Alberta's resource management policy for public lands and resources within the area. It is intended to be a guide to resource managers, industry and the public with responsibility or interests in the area rather than as a regulatory mechanism. Resource potentials and opportunities for development are identified with a view to assisting in the economic progress of Alberta. The plan is sufficiently flexible so that all future proposals for land use and development may be considered. No legitimate proposals will be categorically rejected. The provincial government is committed to serving Albertans; should a proposal not be in keeping with the provisions of the plan, every means will be taken to explore alternative means for accommodating the proposal in a more appropriate location, either in this planning area or on other public lands. The rejection of any proposal will only be done in writing by the minister or his designate.

A detailed outline for implementation will be provided for this sub-regional plan in order to identify the necessary implementation actions and roles. This implementation outline will also provide for the continuing review of the plan so that it may accommodate changing needs and situations. Wherever possible, the private sector will be provided the opportunity to be actively involved in the operational delivery of the plan.

Implementation is subject to the normal budgetary approval process. In establishing overall priorities, opportunities in other planning areas and areas currently outside the planning process will be considered.

While the plan identifies resource potentials and opportunities, the realization of these may require the dedication of major amounts of public funds. The plan will be used on the understanding that any actions required for implementation will only be undertaken as budgetary approvals are given in the normal way. The private sector will be given the first opportunity to provide any development required.

This plan has no legal status and is subject to revisions or review at the discretion of the minister of Forestry, Lands and Wildlife.

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1. INTRODUCTION

1.1 The Planning Area

The Livingstone-Porcupine Hills planning area is located in southwestern Alberta (Figure 1). Situated northwest of Pincher Creek and west of Claresholm in the Eastern Slopes (Southern Region) the area encompasses approximately 3 640 km^2 (1405 sq mi). The planning area includes a diversity of landscapes, ranging from alpine and sub-alpine in the west to montane, parkland and fescue grassland in the east.

The boundaries of the planning area are defined as follows:

NORTH - The height of land between the Oldman and Highwood drainages, then the Forestry Trunk Road (S.R. 940) - Johnson Creek Road (S.R. 532), and then the northern boundary of Township 15, Ranges 2 and 3, W5 Meridian.

EAST - The eastern boundary coincides with the Eastern Slopes regional plan boundary.

SOUTH - The height of land between the Castle and Crowsnest drainages and then the southern boundary of Township 7, Ranges 1, 2 and 3, W5 Meridian.

WEST - The Alberta-British Columbia border forms the western boundary.

The Municipality of Crowsnest Pass is excluded from the Livingstone-Porcupine Hills planning area.

The central and most easterly portions of the planning area are predominantly patent lands which are employed mainly for grazing. The plan does not apply to these lands.

1.2 Regional Population and Employment Profiles

The allocation and management of natural resources and public lands in the Livingstone-Porcupine Hills planning area will undoubtedly influence the region within which it occurs from a socio-economic perspective. Conversely, social needs and economic activity within the surrounding region will influence the way in which natural resources and public lands are allocated and managed in the planning area. These interrelationships warrant appreciation so that natural resources can be managed in context with regional needs.

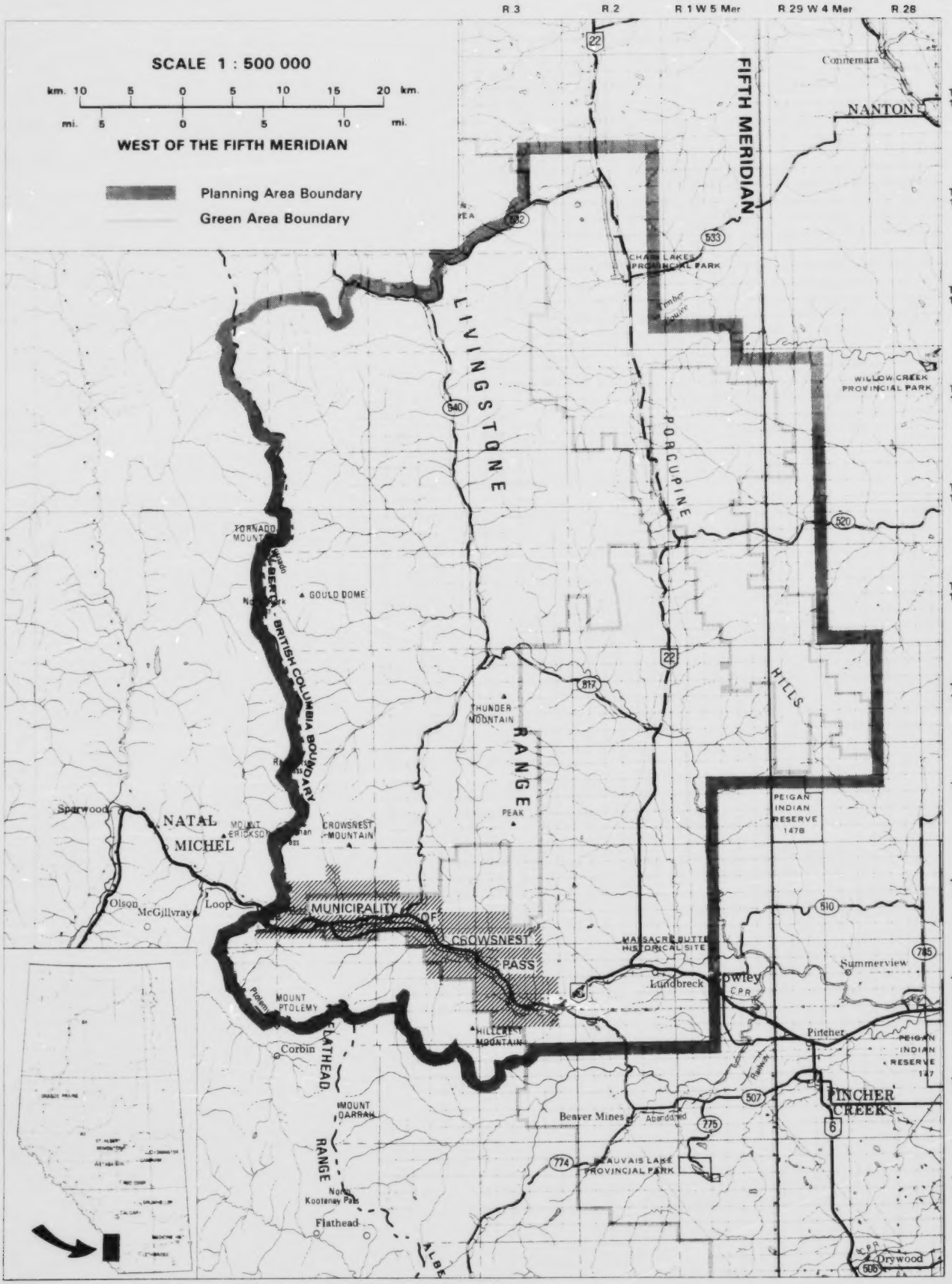


Figure 1. LIVINGSTONE - PORCUPINE HILLS PLANNING AREA.

For descriptive purposes, a geographical area has been delineated to facilitate a review of regional population and employment characteristics (Appendix). To assist with data collection, the boundaries for the Livingstone-Porcupine Hills region have been aligned with Census Canada enumeration area boundaries. The region contains the Livingstone-Porcupine Hills planning area and immediately adjacent areas considered to have direct economic linkages with the planning area (Douglas Webster, pers. com.)

Population Characteristics

The Livingstone-Porcupine Hills region had a total population of 20 525 people in 1981 according to Statistics Canada. The male-female distribution is roughly even at 51 per cent male and 49 per cent female (Figure 2). Twenty-four per cent of the population was under the age of 15. Approximately 60 per cent of the population was between ages 16 and 65. Approximately 13 per cent were over 65 years of age.

The Livingstone-Porcupine Hills planning area's population was estimated to be 8 900 people in 1981, or 43 per cent of the regional population. The planning area's population dynamics resemble those of the surrounding region: similar male-female ratio and population stratification by age.

Employment Characteristics

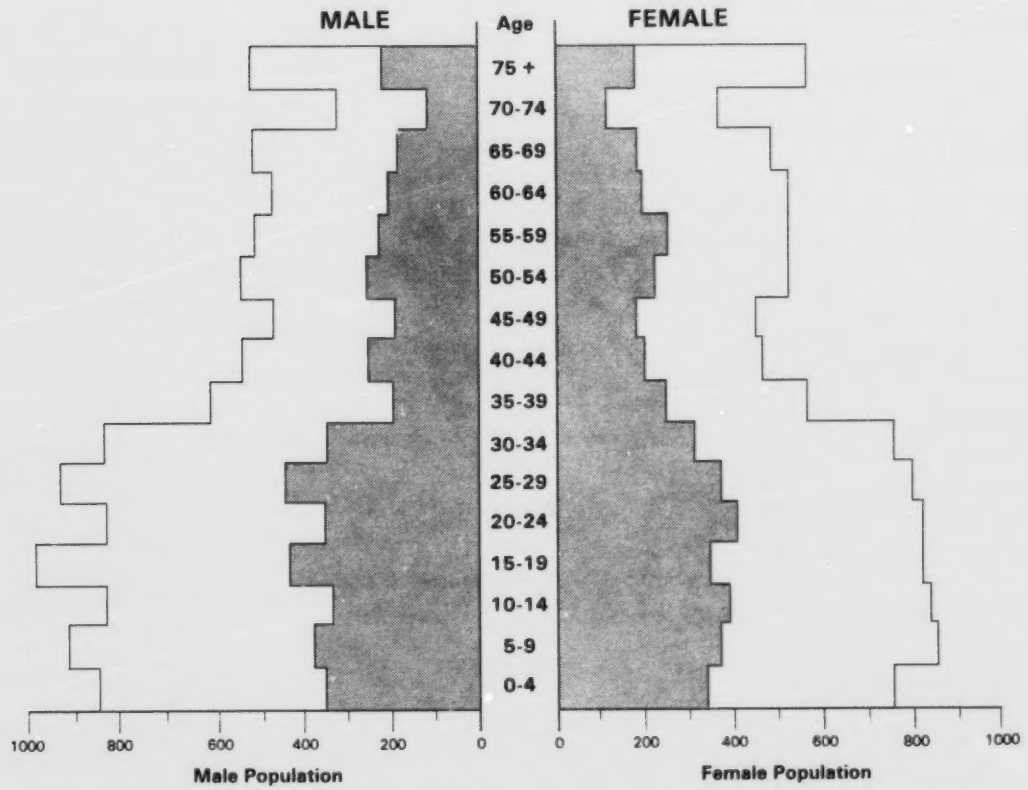
The Livingstone-Porcupine Hills region had a population of well over 12 000 people who were eligible for entry to the labor force in 1981. The unemployment rate for the regional labor force in 1981 was 4.2 (410 people) per cent.

Several trends are apparent in regional employment from 1961 to 1981.

Tertiary industries have performed strongly with a steady increase in employment. In 1961, this sector employed about one-third of the regional labor force. By 1981, its share of the regional labor force approached one half. Employment in this sector has almost doubled from nearly 2 500 employees in 1961 to approximately 4 800 in 1981 (Figure 3). The primary and secondary industries show corresponding decreases in employment between 1961 and 1971, with moves toward stabilization between 1971 and 1981.

Primary resource industries out-performed tertiary industries in terms of regional labor force share in 1961, but experienced an overall decrease by 1981. Within the primary sector, agricultural and mineral resources industries were prominent employers. Agricultural employment dropped from 29 per cent in 1961 to 13 per cent in 1981 (860 fewer employees).

LIVINGSTONE-PORCUPINE HILLS ECONOMIC REGION
POPULATION STRATIFICATION



Source: 1981 Census of Canada data prepared by the Alberta Bureau of Statistics.

Figure 2. 1981 POPULATION STRATIFICATION BY AGE AND SEX FOR THE LIVINGSTONE-PORCUPINE HILLS REGION

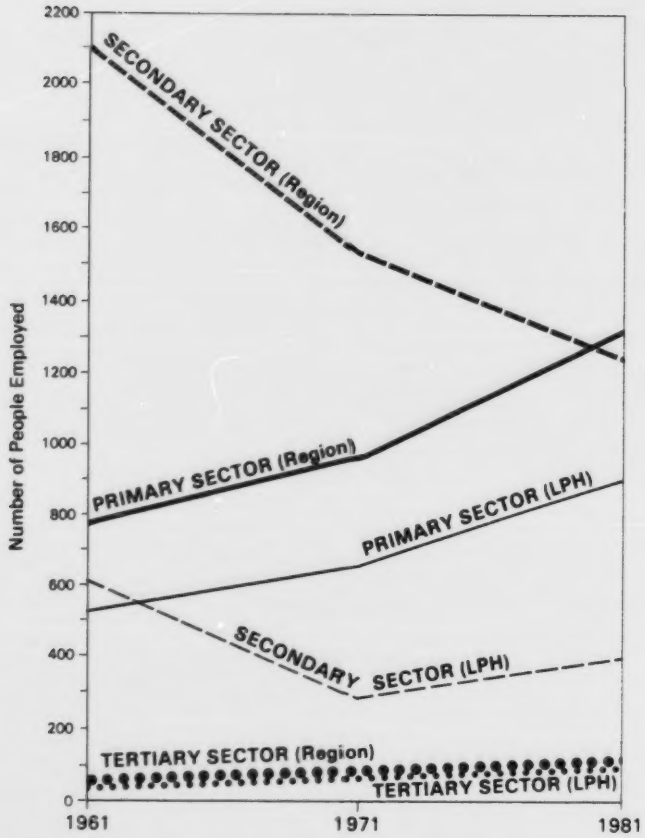


Figure 4

PRIMARY SECTOR EMPLOYMENT ESTIMATES FOR THE LPH PLANNING AREA AND THE ECONOMIC REGION

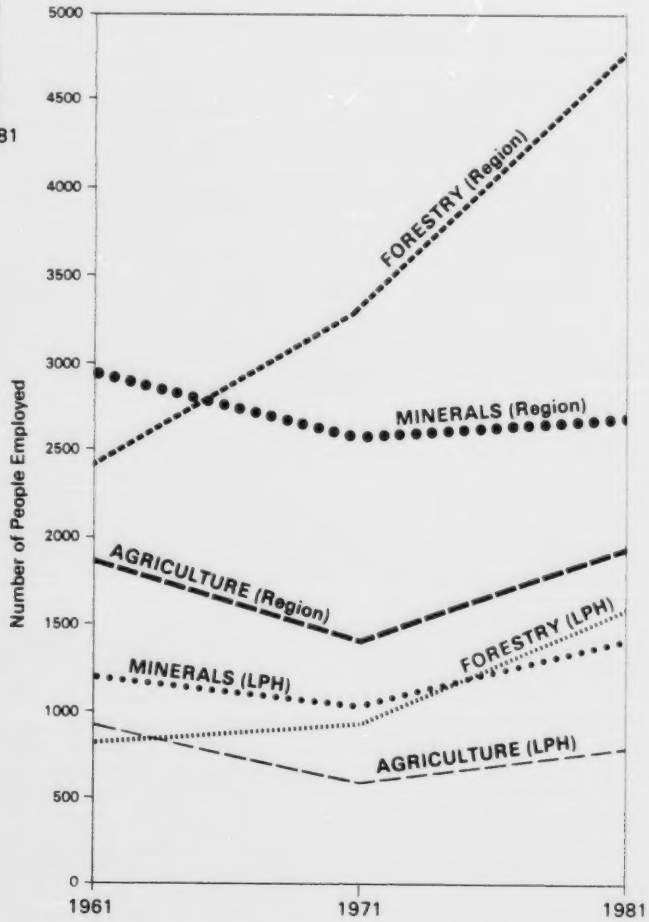


Figure 3

EMPLOYMENT ESTIMATES BY INDUSTRY FOR THE LPH PLANNING AREA AND THE ECONOMIC REGION

Employment in the mineral resource industries rose slightly over this period from 10.6 per cent to 13.4 per cent (542 more employees). It is highly possible that the minerals sector absorbed employees from the agricultural sector over this period. Forestry, fishing and trapping resource sectors were not major employers of the regional labor force in 1961, 1971 and 1981.

The secondary industrial sector held last place as a regional labor force employer. One quarter of the labor force was employed by secondary industries in 1961. Less than 20 per cent was held by these industries by 1971 and 1981 (Appendix).

Trends in employment from 1961 to 1981 are also apparent within the Livingstone-Porcupine Hills planning area. The minerals resource sector out-performed the agricultural sector in terms of labor force share in 1971 and 1981 (Figure 4). Second, the agricultural sector fared more strongly in areas adjacent to the planning area.

1.3 Purpose of the Plan

The Livingstone-Porcupine Hills area was identified as a priority for integrated resource planning in March, 1978, by the Alberta Forestry/ Alberta Recreation, Parks and Wildlife Assistant Deputy Ministers Committee. Further direction for preparing the plan came from the Resource Integration Committee following its formation in February, 1979.

The terms of reference (Alberta 1980) establishes the overall goals and objectives for the planning process to achieve in the Livingstone-Porcupine Hills planning area. The goals include:

* Identification of guidelines for resource use and the management of public land, while recognizing existing uses of private lands.

* Achievement of social and economic benefits by providing for the optimal use of all resources, while maintaining the overall integrity of the natural environment for which the area is known.

Four objectives or tasks were subsequently assigned and achieved in the planning process to meet these general expectations. The first task called for the refinement of the Eastern Slopes zoning as it applied to the Livingstone-Porcupine Hills planning area. A Policy for Resource Management of the Eastern Slopes, Revised 1984 contains the zoning configuration in effect for the planning area until refinements are approved by the Alberta cabinet. The second task called for the development of resource management guidelines for specific land areas within the refined Eastern Slopes zones. The third and fourth tasks called for the establishment of effective procedures and mechanisms for the implementation, monitoring and review of the plan.

1.4 Overview of the Planning Process

The Resource Planning Branch in the Resource Evaluation and Planning Division of Alberta Forestry, Lands and Wildlife was given the responsibility of co-ordinating and preparing the Livingstone-Porcupine Hills Sub-Regional Integrated Resource Plan. An interdisciplinary planning team was formed, composed of management agencies in Alberta Forestry, Lands and Wildlife (Alberta Forest Service, Fish and Wildlife Division, Public Lands Division), Alberta Energy (Mineral Resources Division), Alberta Recreation and Parks, Alberta Environment and Alberta Agriculture. Management agencies providing consultative services to the planning team included the departments of Alberta Culture, Alberta Tourism, Alberta Transportation and the Energy Resources Conservation Board. The preparation of the terms of reference was the planning team's first task. That document, approved by the Resource Integration Committee in April 1980, after a one-year suspension of the planning process, describes the planning area, the purpose of the plan, resource management concerns and issues, and briefly explains the planning process.

Once the terms of reference were completed and approved, the planning team began data collection and analysis. During that stage of the planning process, the planning team analyzed and evaluated the resources of the Livingstone-Porcupine Hills area in terms of their capability to sustain use, the present use of and demand for each resource, the potential for future development and the objectives and policies of participating agencies.

After data collection and analysis was complete, the planning team began policy formulation. The Livingstone- Porcupine Hills Resource Management Policy was developed by the planning team, endorsed by the Southern and Eastern Slopes Regional Resource Management committees (May 1983) and the Resource Integration Committee (December 1983) and was distributed to public groups for comment (February 1984). The Resource Management Policy included broad resource management objectives for the overall planning area, resource management objectives specific to smaller planning units and proposed revisions to the Eastern Slopes zoning.

Public groups responded with their views on the Resource Management Policy. The public feedback received, together with further examination of resource information, the refinement of agencies' objectives and direction from senior government officials, was used to prepare the draft plan.

In November 1986, the draft plan was the subject of open houses and public information exchange sessions. Comments associated with this public review have been considered in subsequent draft plan revisions.

1.5 Organization of the Plan

Chapter 2 provides a framework of broad resource management strategies for the entire planning area under specific resource manage-

ment headings. The natural resources for which the Livingstone-Porcupine Hills area are noted are reviewed according to their capability, current and future uses and demand. In addition, problem areas are identified. This information provides the context for a statement of broad resource management objectives and guidelines which have general application throughout the planning area.

Chapter 3 reviews the refinement of the Eastern Slopes zoning for the Livingstone-Porcupine Hills area in general terms. The intent of the land use zones are specified.

Chapter 4 identifies seven land areas in the Livingstone-Porcupine Hills area for more detailed management purposes. Within the overall context of resource uses and management prescriptions for these areas, rationale for Eastern Slopes zoning refinements is given and detailed resource management objectives and guidelines are outlined.

Chapter 5 provides a general discussion on administrative structures necessary for plan implementation, review and amendment.

2. RESOURCE MANAGEMENT STRATEGY FOR THE LIVINGSTONE-PORCUPINE HILLS PLANNING AREA

The resource management strategy for the Livingstone-Porcupine Hills planning area consists of a statement of primary intent for resource management within the planning area, plus a set of broad resource management objectives and guidelines. A statement of primary intent indicates the resource management emphasis for an area. This involves the selection of one or several objectives from the complete set of resource management objectives which has been identified for the area. Development of the primary intent statement is based on an assessment of the significance of particular resource management objectives within the area. A resource management objective can be defined as a statement of a desirable condition or state for a resource or resource use which can be achieved through management action. A resource management guideline is a statement of direction which guides resource use and management action toward the achievement of resource management objectives.

The primary intent for the resource management within the Livingstone-Porcupine Hills planning area is:

> To achieve social and economic benefits by providing for the optimal use of all available resources, while maintaining the overall integrity of the natural environment for which the area is known.

The second component of the resource management strategy for the Livingstone-Porcupine Hills planning area includes the following set of resource management objectives and guidelines.

Water and Watershed

The Livingstone-Porcupine Hills planning area constitutes a significant portion of the headwaters of the Oldman River that eventually flows into the South Saskatchewan River. In southern Alberta, both the Oldman and South Saskatchewan Rivers are heavily used downstream for irrigation purposes. Water is also used for domestic and recreational purposes. The major drainages in the planning area are the Oldman, Livingstone and Crowsnest rivers. These drainages are provincially significant for their fisheries and recreational values.

That portion of the planning area west of the Livingstone Range is characterized by a rugged mountainous environment. Surficial materials vary from residual bedrock and colluvial material on the upper and mid-slopes, till on the lower slopes and valley bottoms to gravelly illuvial material associated with watercourses. The Porcupine Hills portion of the planning area consists of a series of rolling, unglaciated hills with residual deposits developed in place and of finer textures.

Precipitation throughout the planning area is high, generally increasing toward the west at the higher elevations. Approximately 60 per

cent of the annual precipitation is snow and streams tend to peak in spring with the snowmelt. Streams respond to major storm events throughout the year, however, the drainages west of the Livingstone Range receive more precipitation and tend to yield water more rapidly. Terrain sensitivity, stream channel stability and stream sedimentation tend to be a greater concern in the eastern portion of the planning area, notably the Porcupine Hills.

Current land use levels in the planning area do not have a serious impact on the Oldman River Basin. Rather, local impacts have influenced and continue to influence stream conditions in the planning area. Land management practices should focus on local conditions as watershed protection has the highest priority in the Livingstone-Porcupine Hills planning area.

Broad Resource Management Objectives

1. To maintain and improve water quality, quantity and flow regime for aquatic habitat and onstream and downstream users.

2. To prevent vegetation changes that could cause extreme fluctuations in streamflow resulting in erosion of channel materials, high sediment loads, property damage or water supply problems.

3. To prevent or minimize soil erosion occurrences associated with land use activities.

4. To proceed with proposed reclamation projects in the planning area.

Broad Resource Management Guidelines

1. The Livingstone-Porcupine Hills planning area will be included as a portion of a watershed management plan to be prepared for the Bow/Crow Forest.

2. Forest management activities including timber harvesting and land clearing for range improvement will be conducted in a manner conducive to the maintenance or improvement of water yields. The use of tested procedures to predict water yield changes resulting from vegetational changes will guide resource management programming.

3. Soil erosion associated with land use activities, throughout the planning area, will be addressed through ground rules established for resource development and the internal referral systems of the provincial government.

4. Reclamation projects will be initiated and completed based on provincial reclamation policies and the availability of funds where the responsibility rests with the provincial government. More specific guidelines are given as necessary on a resource

management area basis. Where site reclamation is the responsibility of resource development companies, reclamation projects will be undertaken in accordance with provincial statutes and regulations and operating ground rules established for each development project.

Wildlife

The Livingstone-Porcupine Hills planning area is regionally and provincially important for five ungulate species; sheep, elk, moose, white-tailed and mule deer. The summer population estimate for sheep **(Ovis canadensis)** in the planning area is 265. This represents approximately 40 per cent of the southern Alberta population and five per cent of the provincial sheep population. There are approximately 2 230 elk **(Cervus elaphus)** in the planning area. This represents approximately 35 per cent of the southern Alberta population and 17 per cent of the provincial elk population. The planning area contains about 1 275 moose **(Alces alces)**. This represents about 55 per cent of the southern Alberta population and two per cent of the provincial moose population. Mule deer **(Odocoileus hemionus)** and white-tailed deer **(Odocoileus virginianus)** populations have been estimated at 6 500. This represents about 20 per cent of the southern Alberta population and four per cent of the provincial population.

These ungulate populations sustain a substantial amount of hunting, regionally and provincially. The elk population provides hunting opportunity for about 25 per cent of Alberta's elk hunters and sustains about 31 per cent of the provincial elk harvest (1977 statistics). Deer in the planning area provide 20 per cent of the provincial deer harvest (1978 statistics). The planning area also contains a goat **(Oreamnos americanus)** population, plus populations of black bears **(Ursus americanus)**, grizzly bears **(Ursus arctos)** and cougars **(Felis concolor)**. Based on harvest statistics, the Livingstone-Porcupine Hills area contains a substantial portion of the provincial cougar population. Populations of furbearers, upland game birds, raptors and several non-game species are found in the planning area.

Broad Resource Management Objectives

1. To maintain, or increase, the number, distribution and diversity of wildlife species, maintain critical ungulate ranges, protect migration routes and maintain recreational and commercial uses of wildlife by hunting, trapping and viewing.

2. To maintain a forage base capable of sustaining the following wildlife populations:

   Sheep - 265 in summer and 190 in winter

   Goats - 100

   Elk - 2 230

Mule Deer - 5 300 in summer and 4 900 in winter

White-Tailed Deer - 1 200 in summer and 1 100 in winter

Moose - 1 275 in summer and 1 255 in winter

Broad Resource Management Guideline

1. Operational activities in the planning area must be reviewed and input provided according to existing referral systems. Where necessary, mitigative techniques will be recommended to compensate for habitat losses, disruption of wildlife populations, and lost recreational/commercial opportunity or provide initiatives for habitat enhancement to benefit wildlife populations.

Fisheries

Lakes and, in particular, streams in the planning area comprise some of the most productive and popular trout-producing waters in Alberta. The area has three Class 1 trout streams (Crowsnest, Livingstone and Oldman rivers). This is particularly significant because of the scarcity of Class 1 trout streams in Alberta. These streams are outstanding for trout fishing and have special distinction in Alberta. Access to the area is good and most of the lakes and streams are subject to heavy angling pressure. The area is best known for its stream fishing although there are several lakes with good trout fishing. Originally, many of the lakes were barren of fish, but the streams were inhabited by native cutthroat trout **(Salmo clarki)**, Bull trout **(Salvelinus confluentas)**, mountain whitefish **(Prosopium williamsoni)** and other non-game species. More recently, rainbow trout **(Salmo gairdneri)**, brook trout **(Salvelinus fontinalis)**, brown trout **(Salmo trutta)** and lake trout **(Salvelinus namaycush)** have been introduced. A brood trout facility constructed and operated as part of a project to make Alberta self sufficient in trout eggs for fish culture purposes is found on Allison Creek.

Broad Resource Management Objective

1. To increase the abundance, distribution and recreational opportunities of the fisheries resource in the planning area.

Broad Resource Management Guidelines

1. Operational activities in the planning area will be reviewed according to existing referral systems and input based on fisheries habitat protection guidelines will be provided. Where necessary, mitigative techniques will be recommended to compensate for habitat loss, minimize siltation and to provide initiatives for stream habitat enhancement.

2. Streams in the planning area will be managed according to Alberta Eastern Slopes' fisheries management program.

Recreation

The planning area is noted for its recreation potential because of its diverse natural landscape and physical amenities which attract the recreating public. Most of the recreational use originates from major urban centres, including Calgary, Red Deer, Lethbridge, Medicine Hat and the Crowsnest Pass. A degree of transient recreational use associated with tourism through the Crowsnest Pass area also occurs.

Hunting, fishing and wildlife viewing, are the most popular traditional activities throughout the planning area. Equestrian trail riding takes place for the most part, in the Livingstone and Oldman River basins, along the Livingstone Range and the north Porcupine Hills, with staging from numerous random sites. Generally, recreation facility use in the planning area tends toward overuse on long weekends during summer. Random camping and off-highway vehicle (OHV) use appears widespread, resulting in corresponding decreases in site quality within portions of the planning area. Random camping and OHV use occur primarily along existing truck trails, seismic lines and logging access roads, resulting in considerable levels of off-trail use.

Winter activities occur on a more constrained basis as the result of limited snow-plowed access and formal staging areas. Recreational snowmobiling is a very popular winter activity that includes long distance excursions and short day trips throughout the planning area. Snowmobiling generally originates from the Crowsnest Pass area, the Cataract Creek Forest Land Use Zone and other points outside the Forest Reserve.

Broad Resource Management Objectives

1. To protect high quality recreation resources for future uses.

2. To maintain existing recreational facilities, as required, to current provincial standards.

3. To provide and promote a wide range of resource-based recreational opportunities.

4. To promote a greater public awareness of existing recreation facilities and opportunities and an understanding of environmental concerns associated with recreational use.

Broad Resource Management Guidelines

1. The maintenance and upgrading of existing recreational facilities will continue within the rationale of long-range recreational development plans.

2. Public recreational opportunities will be provided within the rationale of long-range recreational development plans, employing a multiple-use approach.

3. Recreational opportunities will be promoted where the intent of the recreational use is compatible with environmental conditions, demand and other ongoing or anticipated land uses.

4. Visitor services, including user awareness and education, information services, and promotional efforts will be considered as components of the forest recreation approach in the planning area.

5. Landscape and wildlife values will be considered in conjunction with all resource development.

Tourism

Extensive recreation, including camping, fishing, snowmobiling, and hunting, is the major attraction to tourists in the planning area. Scenic touring is also developing into a popular activity for many visitors. Estimated travel for non-resident visitors during the summer of 1982 indicates the increasing number of people who are using the alternative travel routes through the planning area; 43 000 on the Forestry Trunk Road and 35 000 on Hwy 22.

There are few commercial services north or south of Highway 3 within the planning area. Visitor services and facilities are primarily found in communities outside the planning area; for example, in the Municipality of Crowsnest Pass and the communities of Pincher Creek, Nanton and Claresholm. Several adventure product operators use the Livingstone, Oldman, and Crowsnest Rivers as destinations for commercial river rafting trips.

Livingstone-Porcupine is an immature tourist area compared to other interest spots in Alberta. The area lacks infrastructure, access, services, and accommodation. At this time the nearby populated centres of Alberta such as Lethbridge and Calgary are the major market regions. The United States and other parts of Canada are the potential market regions for this area but, to compete successfully in a North American market, it is imperative that some environmentally compatible development occur in order to service that market.

To meet the demands of resident visitors and visitors from other regions, the following broad objectives and broad guidelines have been developed.

Broad Resource Management Objectives

1. To increase use of the planning area by resident and non-resident visitors by encouraging a variety of tourism opportunities and services where feasible.

2. To encourage the development and expansion of commercial and private tourism and recreation facilities, particularly by the private sector on public land.

3. To ensure the maintenance of the environmental quality and aesthetics of the planning area while expanding tourism opportunities in the area.

4. To increase, wherever compatible with other resource users, the recreation and economic benefits to Albertans through consumptive and non-consumptive use of the fish and wildlife resource.

Broad Resource Management Guidelines

1. Tourism opportunities such as hiking, canoeing, rafting, trail riding, mountain climbing, cross-country skiing and snowmobiling will be encouraged in appropriate areas. Support services and facilities necessary to stimulate travel in and use of, the area, will also be encouraged.

2. Planning advice will be provided to assist existing and potential operators of commercial tourism facilities and services. Market and demand information will also be supplied where possible.

3. Impacts on the environment from tourism developments will be minimized through:

   - grouping tourism facilities and services where feasible (for example, in existing nodes of development);

   - ensuring careful design of facilities to limit impact on the environment; and

   - encouraging environmentally conscious operation of facilities and services after completion.

Ecological Resources

Ecological resources are unique or representative ecological features or systems which have been identified within the planning area. The Livingstone-Porcupine Hills area is rich in ecological resources. Five of the major ecoregions present in Alberta are represented in the area. These are the fescue grassland, the aspen-parkland, the montane, the subalpine and the alpine. Such a variety of ecoregions within such a relatively small area has resulted in the development of diverse associations and communities of plants and animals. Elements of the ecological resources of the planning area are being managed now for forestry, grazing and fish and wildlife production. The high capability for unique or representative ecological features or systems can be maintained as long as significant reductions in diversity are prevented. Continued care will be taken to ensure consumptive resource uses do not adversely effect ecological diversity.

Broad Resource Management Objectives

1. To protect selected unique or representative natural ecosystems or features.

2. To provide for the recreational, scientific and educational use of ecological resources.

Broad Resource Management Guidelines

1. Existing land use reservations will be maintained to protect ecologically significant areas until any further protection, such as natural area or ecological reserve designations, is approved and established.

2. For any areas approved as ecological reserves or natural areas, a management plan will be prepared with interdepartmental participation. The plan will outline the purpose, its boundaries, and permitted uses, in keeping with guidelines in the Livingstone-Porcupine Hills integrated resource plan.

Historical Resources

Historically, the planning area was the focus for considerable early coal mining, ranching and forestry. These sites are located throughout the region. With respect to known historic resources, there are a number of interesting farmstead/ranches in the area near Lundbreck (i.e., the Woldbert Ranch, formerly a Doukhobor Colony), and at least three large sandstone residences (two near Cowley and one near Lundbreck).

Archaeological investigations in the planning area have been largely concentrated on specific, limited locations. These studies have demonstrated the presence of many prehistoric sites along some of the major drainage systems. Based on these results, it is believed that the potential for the discovery of additional sites in diverse geographic areas is one of the highest in the province. In particular, mountain passes, alpine meadows, terraces along streams and rivers and the entire foothills portion of the planning area (especially the Porcupine Hills), are considered high potential.

The palaeontological potential of the Livingstone-Porcupine Hills area is high. The Porcupine Hills, created by the west limb of the Alberta Syncline, are underlain by Mesozoic units capped by discontinuous patches of Porcupine Hills Formation and Pleistocene sediments. The Rocky Mountain Foothills consist primarily of Mesozoic and Cenozoic age strata which have been folded and faulted, and commonly contain outcrops of Fernie, Kootenay, Passage beds, Blairmore, Blackstone, Cardium, Wapiabi, Belly River, Willow Creek and Porcupine Hills formations. The Rocky Mountain Front Ranges are made up of thrusted sheets which bring Palaeozoic rocks to the surface within the planning area. In addition to the Mesozoic units mentioned, Fairholme, Banff, Rundle, Rocky Mountain

and Crowsnest groups and formations have also been mapped. All of these formations may be fossiliferous. Potential occurrences are consequently widespread and varied: Palliser --corals, brachiopods and crinoids; Exshaw --cephalopods, fish; Banff --corals, brachiopods, crinoids; Rundle --corals, brachiopods, pelecypods, gastropods, pleisosaurs; Kootenay --plants; Blairmore --plants, freshwater mollusks; Belly River --mollusks, plants, dinosaurs; Willow Creek --chara, gastropods, pelecypods, dinosaurs, fish; Porcupine Hills --mollusks, plants; Cardium --pelecypods; and Wapiabi --cephalopods, pelecypods.

Very little work has been done on the palaeontological resources in the region. There are a number of significant fossil sites, the most notable of which are associated with large vertebrate remains in the Fernie, Belly River and Willow Creek formations. Virtually any outcrop in the area may contain fossils. Exposures along creeks and rivers, ridges above the tree line or on steep slopes are considered to possess the highest potential.

Because of its glacial history and its position with respect to a presumed "Ice Free Corridor", the Porcupine-Livingstone region has high potential for providing long and detailed records of Holocene palaeo-environmental conditions. These records may be obtained by techniques such as pollen analysis of sediments and deposits accumulated in waterlogged sites such as lakes and bogs. The best and most continuous records of environmental change are likely to be obtained from deeper lakes and bogs which do not dry up in summer. Such sites are probably comparatively rare in the Porcupine-Livingstone region and thus should have a high priority for scientific investigation when identified. In addition, detailed records of environmental change, specifically climatic change, can be obtained from the analysis of the growth pattern and characteristics of tree rings. Such studies may give information on drought history and temperature patterns extending several hundred years beyond the instrumental record. This information may be valuable for long-term planning for climatic change, water resources etc. Prime sites for this type of research occur where trees are growing under stress. These sites would occur at upper and lower tree-lines within the area. Because of the fragility and vulnerability of trees in such sites, high priority should be given to the scientific investigation of old (greater than 200 years) stands of trees at tree-lines.

Broad Resource Management Objectives

1. To protect historical resources (archaeological, historical and palaeontological) from potential or actual impact related to future resource developments; and to conserve these resources for future generations.

Broad Resource Management Guidelines

1. Resource uses in the Livingstone-Porcupine Hills area that will result in land surface disturbance may require Historical Resources Impact Assessments prior to development.

2. The Archaeological Survey of Alberta, Resource Management Section, will participate in the land use referral process by reviewing proposed development projects within those areas considered to have high historical resources potential. These areas are outlined by resource management area.

3. Timber stands 200 years and older within the Alpine-Subalpine ecotone (upper and lower tree-line) throughout the planning area may supply significant information on the palaeoenvironmental history of the region. The Alberta Forest Service will refer sanitation projects to the Archaeological Survey of Alberta to ensure scientific investigations (e.g. core sampling) can be conducted prior to the removal of insect-infested or diseased timber.

Timber

The timber sector provides an important contribution to the economic well-being of the Crowsnest Pass area. In addition to the employment derived from the three sawmills in the area, timber harvesting activities, including road development and bush operations, provide other economic benefits. The local economy also benefits from the marketing of forest products in the area and from the export of products to other markets.

The timber resources of the subregion are currently managed under two forest management units; C5 and C02. The C5 Forest Management Unit supports an estimated coniferous annual allowable cut of 165 753 m^3 (38 620 Mfbm) based on a 15+/11 cm utilization standard and includes the Castle River planning area. There is also deciduous potential within the C5 Unit. The estimated Annual Allowable Cut (AAC) for deciduous is 17 800 m^3 (4 147 Mfbm) at a 15+/11 cm utilization standard. Over 90 per cent of the deciduous AAC for the unit is located within the planning area.

Coniferous timber commitments in the C5 Unit total 153 714 m^3 (35 815 Mfbm) or 94 per cent of the total AAC. These commitments include four Coniferous Timber Quotas and five Miscellaneous Timber Use Areas. There are currently no deciduous timber commitments in this area. Timber harvesting operations will be concentrated in the Livingstone-Porcupine Hills (LPH) planning area portion of the C5 Unit for the next 40 to 50 years. This is as a result of an age-class imbalance between the Castle River and Livingstone-Porcupine Hills portions of the C5 Unit.

The recent mountain pine beetle infestation in the Castle River planning area, and a fire in 1936, severely reduced the occurrence of merchantable, older age-class timber in this area. The preponderance of mature and overmature timber in the Livingstone-Porcupine Hills planning area is estimated to contain sufficient volume to support the commercial requirements of the C5 Unit until such time as the Castle River area again contributes to annual harvests at significant levels. Forest management throughout the planning area will include the provision and

maintenance of a forest land base capable of sustaining both commercial and local demands for timber. Forest management techniques utilized will promote a healthy and stable forest environment in conjunction with other demands on the forest land base.

Mountain pine beetle control measures are in place throughout the planning area. A control area of approximately 305 620 hectares (755 177 acres) has been established covering lands from the Highwood River drainage through to the Crowsnest River drainage. Over 95 000 trees have been removed under this program. Thus far, the control program has been effective in preventing another serious outbreak. Sanitation and salvage efforts will continue throughout the planning area to protect the forest and promote healthy and stable forest conditions.

As the Livingstone-Porcupine Hills planning area provides opportunities for a wide range of land uses, fire protection measures are important to ensure public safety and the protection of natural resources. The planning area has experienced a high frequency of both human and lightning-induced fire starts since 1980.

Forest protection measures against wildfires involve fire prevention, detection, pre-suppression and suppression. Fire prevention involves public education to prevent or minimize the risk of wildfires. Detection efforts include five lookouts in the Porcupine Hills, Livingstone (north of the Gap), Sugarloaf Mountain, Ironstone and Hailstone Butte (Kananaskis Country). Lightning detectors located throughout the Eastern Slopes region provide accurate detection information as does aerial detection by regular patrols. The public -- local residents and visitors -- also plays an important role in fire detection. Pre-suppression and suppression efforts include the mobilization and deployment of initial attack crews generally located at Blairmore, the Highwood and Kananaskis areas and helitack crews generally located at Livingstone-Gap and Porcupine Hills. Air tanker bases are at Calgary and Pincher Creek. The deployment of crews and equipment is dependent upon forest conditions and fire danger ratings.

Broad Resource Management Objectives

1. To manage the timber resource on a sustained-yield basis to satisfy commercial and local timber requirements.

2. In the short term, to maintain mountain pine beetle control measures in the planning area.

3. To maintain healthy and stable forest conditions.

4. To protect the forest from damage and destruction by fire, insects and disease.

5. To protect the forest from the occurrence of wildfires in order to maintain public safety and prevent property damage.

6. To encourage forest research in insect management problems, site productivity and reforestation on steep slopes.

7. To manage forest vegetation in a manner that will not cause detrimental changes to stream flow.

Broad Resource Management Guidelines

1. The forest land base includes all lands within the Bow/Crow Forest where forest management for sustained yield production or other purposes is undertaken. The sustained yield land base generally consists of lands designated under the Eastern Slopes Policy (revised 1984) where logging is a compatible or permitted land use activity.

2. The sustained yield land base will be managed to provide for an estimated commercial demand level of 144 214 m^3 (33 602 mFbm) for coniferous timber on an annual basis over the next 40 to 50 year period at a 15+/11 cm utilization standard. An estimated annual allowable cut of 5 700 m^3 (1 328 mFbm) for coniferous timber will be for use by local residents. A portion of the estimated deciduous annual allowable cut of 17 800 m^3 (4 147 mFbm) will be available for local and commercial use in the planning area at the 15+/11 cm utilization standard as demand warrants.

3. Timber harvesting operations will be concentrated in this portion of the C5 forest management unit for the next 40 to 50 years as a result of the age-class imbalance in the Castle River planning area.

4. Timber harvesting will be planned and conducted using landscape logging techniques. The minimum requirements for these techniques are described in Forest Landscape Management Guidelines for Alberta, FLW Publication T125, 1986) and principles contained in the Timber Harvest Cutblock Design Manual (Alberta, ENR Report 43, 1977).

5. The mountain pine beetle control program within the control area will involve the identification and removal of infected trees.

6. Continued and increased productivity of the forest land base will be ensured through intensive forest management techniques, reclamation of surface disturbances and reforestation of harvested stands according to the established reforestation policy.

7. Sanitation treatments and/or salvage operations will occur where required following analysis of potential environmental impacts by resource management agencies.

8. Forest fuel modification treatments by mechanical means or the use of prescribed burns will be considered for forest management purposes throughout the planning area to reduce the risk of wildfire and to maintain public safety.

9. Timber management plans will integrate harvesting and reforestation with other land use activities such as recreational developments, range management or wildlife habitat management.

10. Reforestation efforts will consider the use of a diversity of tree species near recreation facilities and high use areas.

11. The impacts of logging operations on watersheds will be minimized by ensuring adherence to operational ground rules, pre- and post-operational watershed assessments and procedures set out in the internal referral systems of the provincial government.

12. Fire protection measures will continue to be undertaken throughout the planning area as a component of the fire management program developed for the Bow/Crow Forest. The use of prescribed fire for land or resource management purposes will be strictly controlled and monitored according to fire management policy.

13. Resource and land development proposals or projects will include fire protection assessments as part of the internal referral systems of the provincial government through the forest protection section. Assessments will address public safety aspects and risk management associated with the size and location of developments within the forest protection area. Consultative services concerning forest protection measures will be available to I.D. 6, M.D. 9 and M.D. 26 adjacent to the forest protection area.

Range and Agricultural Resources

Domestic livestock grazing has been an integral component of the land use pattern in the planning area since the turn of the century. Livestock production is the mainstay of the agricultural industry in the Livingstone-Porcupine Hills area. The Rocky Mountain Forest Reserve and Crown lands in the White Area collectively support 94 757 animal unit months of grazing.

Rangelands within the Forest Reserve were heavily grazed in the early 1900s to help reduce the wildfire hazard resulting from fuel buildup. Since 1947, as the knowledge of range management stocking rates improved, reductions in range use were employed to return the range to a condition capable of sustaining long-term use.

There are 40 complete grazing allotments within the Livingstone-Porcupine Hills planning area. The permitted stocking rate on those allotments, as estimated in 1977, was approximately 31 842 animal unit months. At about that time, the status of a number of grazing allotments

and leases was changing such that the stock rate on allotments has now been estimated at 32 171 animal unit months. A grazing lease (Waldron), managed by the Alberta Forest Service and Public Lands Division within the Forest Reserve, accounts for an estimated 1 860 animal unit months. The Alberta Forest Service also manages a portion of this grazing lease in the White Area accounting for approximately 167 animal unit months. Therefore, the estimated stocking rates and carrying capacities for both allotments and grazing leases in the Forest Reserve portion of the planning area is estimated at 34 031 animal unit months. The management strategy for rangelands in the Forest Reserve portion of the planning area will emphasize the maintenance of grazing levels at approximately 34 031 animal unit months.

Brush encroachment and the loss of rangelands to other resource uses has considerably reduced range capacity. In order to maintain the specified grazing levels within the Forest Reserve, range improvements will be required. A number of sites including grasslands, brushlands and deciduous stands have potential for range improvement. Those resource management areas having the greatest reductions in capacity and having potential sites for range improvement will be given priority for range development planning as determined on a provincial basis according to annual budget commitments.

The resource management areas west of the Livingstone range will be limited to maintaining the productivity of existing rangelands in the short term. The resource management areas east of the Livingstone Range demonstrate better potential for range improvement and will be considered for brush and aspen conversion to more productive rangelands. Approximately 2 408 hectares (5 950 acres) of range improvement will be required over the long term for grazing allotments within the Livingstone-Porcupine Hills planning area. The areal extent of range improvements will be confirmed as range management plans are revised.

White Area public lands provide an important source of improved and unimproved grazing. There are 68 grazing leases and eight grazing permits in the White Area. These permits and leases encompass approximately 135 423 acres (54 806 hectares) and support approximately 60 726 animal unit months of grazing. The management strategy for public lands in the White Area will emphasize the maintenance of grazing levels at approximately 60 726 animal unit months.

Broad Resource Management Objectives

1. To provide a forage base to support 94 757 animal unit months in the planning area in accordance with the commitment to maintain 1977 grazing levels.

2. To maintain the forage base in good condition, ensuring the protection of watershed values, for use by domestic livestock and wildlife through ongoing operations and maintenance programs.

3. To manage domestic livestock within grazing allotments, leases and permits in the planning area to achieve uniform forage use and good range conditions through range improvements, livestock redistribution as required and intensified range management practices.

4. To maintain and, where possible, increase the animal unit months of domestic grazing in the planning area through range improvement projects.

5. To minimize the competition for range resources between domestic livestock and wildlife.

6. To minimize the impacts of other resource developments in the White Area on the level of grazing use.

Broad Resource Management Guidelines

1. Over the long term a forage base capable of supporting an estimated 34 031 animal unit months, on both grazing allotments and leases in the Forest Reserve, will be provided. An estimated 5 950 acres (2 408 hectares) of range improvement will be required over the long term to achieve range management objectives.

2. Existing range management plans for grazing allotments throughout the planning area will be revised on a provincial priority basis relative to their effectiveness and allotment conditions. Upon completion, range management plans will be updated every five to 10 years. Range management plans contain provisions for range improvement projects and other range management practices required to maintain the range resources. As such, range management plans are subject to watershed and wildlife assessments prior to approval.

3. Range objectives for the Forest Reserve are intended to be achieved using primary rangelands and range management techniques and improvements prescribed in range management and range development plans. The use of secondary rangelands will be promoted where feasible to supplement existing use on primary rangelands.

4. Opportunities for stocking increases assessed through sound range management practices will be considered on an operational basis during the development of range management plans.

5. The informal use of recently-logged areas as temporary range will be encouraged. However, cattle use of the cutblocks will be phased and controlled to ensure coniferous regeneration is not impeded. As cutblocks will be considered temporary range only, they will not be used in long term calculations of carrying capacity. Grazing on cutblocks will provide short-term supplement

for productivity losses due to brush encroachment on the primary range.

6. Range management plans containing provisions for improvement projects on allotments affecting zones 2 and 4 will be developed in accordance with the intent of those zones. Range improvements within Zone 2 will be accomplished considering wildlife habitat enhancement as a complementary benefit.

7. Range improvements will generally be conducted on suitable areas of brush or aspen vegetation with minimal disturbance to coniferous growing stock and wildlife habitat. Improvement efforts will be concentrated on areas where brush encroachment has reduced grazing capacities. Treatments may include mechanical removal of brush and deciduous species and prescribed burns for range management purposes.

Minerals

The Livingstone-Porcupine Hills area is significant provincially for its mineral resources. Of particular importance are the extensive reserves of thermal and metallurgical coals. Most of these reserves are confined to west of the Livingstone Range and they constitute approximately 1 647 megatonnes of established initial in-place resource (Energy Resources Conservation Board (ERCB) Report ST 87-31). When past production (44 megatonnes) and technically unrecoverable volumes (1 991 megatonnes) are accounted for, there remains a recoverable reserve of 612 megatonnes. However by policy (A Coal Development Policy for Alberta 1976) a further 220 megatonnes is inaccessible, leaving 392 megatonnes of known recoverable and accessible coal reserves within the Livingstone-Porcupine Hills planning area. This is still a significant volume as it represents 24 per cent of Alberta's mountain region coal reserves. About one-third of these reserves are surface minable while two-thirds will require underground or in situ techniques for recovery.

There are no operating coal mines within the planning area, although the region has sustained considerable development in the past. Altogether 49 permits to develop mines were issued (ERCB 85-45). Forty of these became active mines producing a cumulative total of 44 megatonnes of coal (ERCB Report ST 87-31). The greatest number of mines were in operation in the mid 1920s to the late 1930s. Mining continued until quite recently at Tent Mountain and in the South Racehorse-Vicary creeks area.

Interest in the coal reserves of the Livingstone-Porcupine Hills area has endured the fluctuations in market demand and pricing. Seven companies with interests in the area cumulatively hold Crown coal lease dispositions for 20 per cent of the planning area, while an additional 30 per cent is held as freehold mineral rights.

Two major natural gas discoveries have been made within the Livingstone-Porcupine Hills area. The Savanna Creek and Coleman fields

were discovered in 1954 and 1969 respectively and yield sour gas reserves from the Rundle and Palliser formations. Thirty-seven per cent of Coleman's and 60 per cent of Savanna Creek's original reserves have been produced. The remaining reserves within the Livingstone-Porcupine Hills area, estimated at 3 588 x $10^6 m^3$ (ERCB Report ST 86-18), may keep the fields active for 20 to 30 years. These gas reserves are sour and will require additional processing. Sulphur scrub operations are taking place at the Coleman gas plant in the Crowsnest Pass. This plant and its tie-in pipelines are the only production facilities in the planning area.

There is optimism for the success of future exploratory drilling in the Livingstone-Porcupine Hills area as the planning area is one-sixth covered by petroleum and natural gas dispositions, geophysical activities continues and 11 of the 59 wells drilled so far have found paying zones of gas. Exploration and development activities for oil and gas can be expected to continue.

Quarriable mineral development, for limestone in particular, has been and continues to be an important activity in and around the Crowsnest Pass. Summit Lime Works Ltd. owns and operates the lime plant in the pass which is one of only three such operations in the province. Crushed processed lime has a tremendous variety of uses. Although limestone is a common mineral found throughout most of the mountain ranges, few areas have such pure limestone found in close proximity to a major transportation network. It is this unique combination that has made and keeps this lime works viable. Future supply options for the plant appear to be most promising in the Phillip's Pass and Deadman Pass areas where reserve purity and haul distance to the plant are favorable. A third area, along the Ptolemy Creek valley of the Flathead Range, also meets the requirements of a limestone deposit capable of development; quality, quarriability and proximity to transportation and processing facilities. Protection of caves in this area has conflicted with quarry development. Deposits of some metallic minerals have been noted within the Livingstone-Porcupine Hills area. The most carefully studied is on Mount Gass where a Lead-zinc-silver occurrence exists. While past exploration concluded that the deposit was too small to have commercial value, interest in it continues. Gold is the only other mineral being sought in the Livingstone-Porcupine Hills area. An existing Quartz Mineral Exploration Permit indicates an area of interest along Highway 940 at the northern extreme of the planning area.

Broad Resource Management Objectives

1. To provide opportunities for the orderly exploration of mineral resources in previously unexplored areas and formations.

2. To provide opportunities for industry to define the extent of and develop or produce proven mineral reserves.

3. To provide for the orderly exploration and development of surface materials, including sand, gravel, clay and marl in a manner that is compatible with environmental considerations.

Broad Resource Management Guidelines

1. All proposals for coal exploration and development must be processed in accordance with A Coal Development Policy for Alberta, 1976.

2. Reclamation of land use disturbances associated with mineral resources exploration and development will occur expeditiously to reduce erosion and stream siltation.

3. Minerals resource exploration and development activities will not be permitted in General Recreation (Zone 4) due to the importance of these areas for intensive recreation.

Access

Most of the Livingstone-Porcupine Hills area is accessible by public roads, seismic trails and utility corridors. The north Porcupine Hills and a few locations east and west of the Livingstone Range in the northern half of the planning area are the only areas with limited access.

The Crowsnest Pass is a vital transportation corridor through Alberta's Rocky Mountains. In addition to the Crowsnest Pass Highway (Highway 3), the corridor contains numerous pipelines and transmission lines and the Canadian Pacific Railway which links the Canadian prairie provinces with west coast ports. The Forestry Trunk Road (Secondary Road 940) is a gravel road which transverses the length of the planning area from the Crowsnest Pass in the south to Kananaskis Country in the north. This road serves as an important access route for resource extraction and recreation. Highway 22 also follows a north-south alignment, and is an important arterial route for the agricultural community in the central portion of the planning area. It also serves as a more direct route to the Crowsnest Pass from points north. Major portions of Highway 22 are being upgraded from a Secondary Road standard. Secondary Road 520, aligned across the central portion of the Porcupine Hills, links Highway 22 to the Town of Claresholm and Highway 2.

Recreational off-highway vehicle use has had impacts, with respect to off-trail use, throughout the planning area. Adverse impacts have been noted particularly in the Livingstone-Upper Oldman, East Livingstone, Porcupine Hills and parts of the West Livingstone resource management areas. Indiscriminate recreation off-highway vehicle use can create terrain damage, reduce water quality as a result of erosion and reduce wildlife range. Access management planning is indicated for the planning area.

Broad Resource Management Objectives

1. To encourage co-ordinated access development for industrial use.

2. To manage recreational off-highway vehicle use to minimize environmental impacts.

Broad Resource Management Guidelines

1. Resource users will be encouraged to use common access corridors to minimize environmental impacts and duplication of effort and expense.

2. An access management plan will be initiated for selected resource management areas to determine an access network suitable for summer and winter recreational off-highway vehicle use. The access management plan will be subject to review by interested government resource management agencies, local authorities, the general public, and public interest groups. More specific guidelines are given, as necessary, on a resource management area basis.

3. (i) Snowmobile use will be considered and permitted on selected routes in Zone 1 when approved through an access management plan.

   (ii) Snowmobile use will not be permitted in Critical Wildlife (Zone 2) areas providing critical ungulate winter range.

3. REFINED EASTERN SLOPES ZONES

A Policy for Resource Management of the Eastern Slopes, Revised 1984 provides policy direction for integrated resource management and planning for the entire Eastern Slopes including the Livingstone-Porcupine Hills area. The document contains two distinct but inter-related components: an Eastern Slopes policy and a regional plan. The former contains policy statements, which define management intentions for the region, and policy guidelines, which identify the most important resource opportunities in the region and the major priorities to be considered in the management of the Eastern Slopes. The regional plan provides more specific resource management direction through a statement of regional objectives and the delineation of regional land-use zones. A general implementation strategy is described for both components. Integrated resource planning is identified as a key mechanism for the implementation of the Eastern Slopes regional plan.

The regional plan relies on a land-use zoning system to identify units of land for which intents and objectives are specified. The system consists of three broad land-use categories which designate large areas of land for varying degrees of protection, multiple-use management or resource development. Within these broad categories, eight detailed land-use zones outline a range of compatible activities (Table 1) in keeping with the intents and management objectives of the zones; the activities and uses listed are only a representative group which may be consistant with any given zone intent. The general intent of each zone is given in Table 2.

The role of integrated resource plans in relation to the regional Plan is outlined in A Policy for Resource Management of the Eastern Slopes: Revised 1984:

> "Integrated resource planning at more detailed levels will provide further guidance for the future. It will also be the means used to develop more specific objectives and subsequent zones. Through integrated resource planning regional objectives and zoning will be confirmed and/or changed in order to ensure the appropriate delivery of benefits to Alberta."

The regional land-use zones for the Livingstone-Porcupine Hills area have been refined on the basis of more detailed information and more specific objectives (Figure 5). The regional zoning maps will no longer apply to the planning area.

The Livingstone-Porcupine Hills plan uses the same set of zones defined in the regional plan for the Eastern Slopes. Direction on the compatibility and conditions which apply to the zones in the planning area is found in Chapter 4 in the form of resource management guidelines.

TABLE 1. COMPATIBLE ACTIVITIES BY LAND USE ZONE

ZONE / ACTIVITY	1 PRIME PROTECTION	2 CRITICAL WILDLIFE	3 SPECIAL USE	4 GENERAL RECREATION	5 MULTIPLE USE	6 AGRICULTURE	7 INDUSTRIAL	8 FACILITY
Non-motorized recreation	■	■		■	■	■		■
Fishing	■	■		■	■	■		■
Hunting	■	■			■	■		
Scientific study	■				■	■	■	■
Trapping	■				■	■		
Trails, non-motorized				■	■	■		■
Transportation & utility corridors					■	■	■	■
Primitive camping				■	■	■		
Intensive recreation				■	■			■
Off-highway vehicle activity					■	■	■	■
Logging					■	■	■	
Domestic grazing					■	■		
Petroleum and natural gas exploration & development					■	■	■	
Coal exploration					■	■	■	
Coal development					■	■	■	
Mineral exploration & development					■	■	■	
Serviced camping				■	■			■
Commercial development								■
Industrial development					■		■	
Residential subdivisions						■		■
Cultivation						■		

■ Compatible Use — Uses that are considered to be compatible with the intent of a land use zone under normal guidelines and land use regulations.

Permitted Use — Uses that may be compatible with the intent of a land use zone under certain circumstances and under special conditions and controls where necessary.

Not Permitted Use — Uses that are not compatible with the intent or capabilities of a land use zone.

These activities are only representative of the range of activities that occur in the Eastern Slopes. For these and any other activities, the possibility of whether they should or should not take place in a particular area must always be measured against the fundamental management intentions for that zone. Since economic opportunities are not all known in advance, site-specific developments may be considered in any zone.

Table 2

INTENTS OF THE EASTERN SLOPES POLICY ZONES

Zone	Title	INTENT
1	Prime Protection	To preserve environmentally sensitive terrain and valuable aesthetic resources.
2	Critical Wildlife	To protect specific fish and wildlife populations by protecting aquatic and terrestrial habitats crucial to the maintenance of those populations.
3	Special Use	To recognize historical resources, scientific research areas and lands which have unique management requirements or legislative status or which can not be accommodated elsewhere.
4	General Recreation	To retain a variety of natural environments to serve as a focus for a wide range of outdoor recreational activities.
5	Multiple Use	To provide for the management and development of the full range of available resources, while meeting long-term objectives for watershed management and environmental protection.
6	Agriculture	To designate lands currently used for or considered suitable for cultivation or improved grazing.
7	Industrial	To recognize existing or approved industrial operations.
8	Facility*	To recognize existing and approved settlement and commercial development areas.

*Not applied in the Livingstone-Porcupine Hills area.

In some instances during the delivery of the plan, the suitability of an activity in a particular location based on more detailed site information and a specific description of the activity (e.g., technology and mitigation measures to be employed) may result in a decision which appears to be contrary to the refined zoning, the Tables of Compatible Activities or guidelines in the plan. In such site-specific instances, the compatibility of a given activity with the management intents and objectives for the area will become a prerequisite before approval.

3.1 Implications of Eastern Slopes Policy Zoning Refinements

The anticipated consequences of the provisions of the Livingstone-Porcupine Hills Integrated Resource Plan on the resources of the planning area are factors to be taken into consideration by those who have responsibility to review and judge the plan. The number of potential implications arising from a plan of this scope are vast. Not all are foreseeable and many are of limited consequence. Accordingly, the planning team has identified only those implications considered to be significant.

The Livingstone-Porcupine Hills plan provides for optimal economic and social benefits with a minimal number of associated costs. The integrity and intents of A Policy for Resource Management of the Eastern Slopes (and related allocative policies) have been upheld. The spectrum of protection, resource management and development zoning has been refined in a rational and justifiable manner. Along with the removal of patent lands from the refined zoning, the plan bridges the gap between the intent of the Eastern Slopes Policy and the action requirements of the land and resource managers.

Implications pertaining to the entire planning area follow, while those related more specifically to each resource management area are found in Chapter 4.

General

1. In order to achieve the intents of the refined zoning as demonstrated through the resource management objectives and guidelines, more intensive management will be required than in the past. This will include greater planning and monitoring efforts, and more interagency consultation and co-operation.

Watershed

1. Watershed protection and management are recognized as priorities throughout the planning area regardless of zoning. Watershed protection and management are key considerations in all zones.

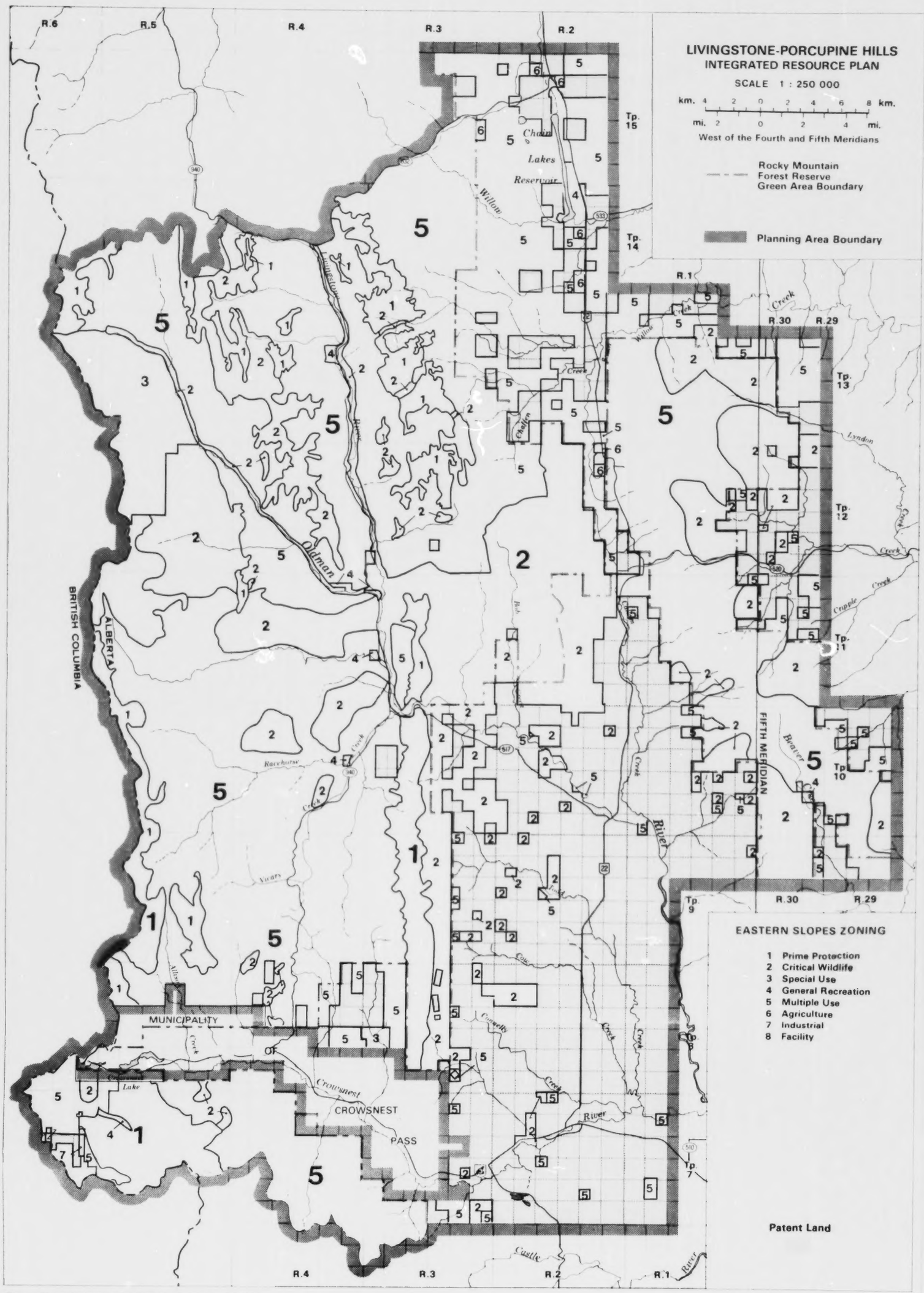


Figure 5 REFINED EASTERN SLOPES ZONING

2. Erosion potential is highest in alpine and sub-alpine areas where slopes are excessive and vegetation growth is slow and sensitive to disturbance. Such areas have been designated Zone 1 where many land uses are not permitted because of terrain sensitivity. Land use activities will subsequently be concentrated along lower slopes and valleys where erosion potential is relatively lower but still of some concern. Increased involvement of watershed managers will be required in reviewing operating plans and resource development applications to ensure watershed objectives are met.

3. Several reclamation projects have been identified throughout the planning area to protect watershed values. These projects will be carried out according to reclamation policies and normal budgetary approvals.

Recreation

1. A wide range of recreational uses are accommodated in the planning area in appreciation of the significance of this use in Alberta's Eastern Slopes. Emphasis is generally placed on dispersed extensive recreation opportunities, with more intensive recreation use areas along established transportation corridors.

2. Both motorized and non-motorized recreational opportunities are accommodated in the planning area. Motorized recreation vehicles will be directed to selected roads and trails to protect sensitive resources throughout the planning area.

Tourism

1. The refined Eastern Slopes zoning allocations together with resource management area intents provide scope for a range of private sector tourism development opportunities.

Wildlife

1. Critical Wildlife (Zone 2) designations throughout the planning area identify habitats crucial for the maintenance of provincially or regionally significant fish and wildlife populations.

Timber

1. A forest land base has been identified for sustained yield and other forest management purposes. The sustained yield land base will satisfy existing and future local and commercial demands for timber.

2. The White Area portion of the planning area will be managed on a sustained yield basis over the long term.

Range

1. Domestic livestock grazing is recognized as a long standing land use in the planning area. The Alberta government's commitment to maintain 1977 grazing levels has been honored.

Minerals

1. Prohibiting all mineral resource exploration and development activities from General Recreation (Zone 4) areas has the implication of sterilizing coal reserves in small portions of the Beaver Creek and Oldman River coal fields. The development of coal leases 6616 and 6618 as well as some freehold mineral rights will be affected and compensation claims could result.

4. RESOURCE MANAGEMENT AREAS

The Livingstone-Porcupine Hills planning area is divided into seven smaller resource management areas to facilitate the geographic location of resource management objectives: 1) Livingstone-Upper Oldman, 2) West Livingstone, 3) East Livingstone, 4) Willow Creek-Lower Oldman, 5) North Porcupine Hills, 6) South Porcupine Hills and 7) Crowsnest Watershed (Figure 6).

More specific resource management objectives and guidelines were developed for individual management areas within the context of the resource management strategy (primary intent and broad resource management objectives and guidelines in Chapter 2) which applies to the entire planning area. The degree of definition or refinement of objectives and guidelines varied among resource management agencies, depending upon factors such as available information.

The geographic location and resource use aspects of the resource management objectives were further refined by using the Eastern Slopes policy zoning and resource use matrix. The zoning configuration presented in the Livingstone-Porcupine Hills Integrated Resource Plan should allow the achievement of stated resource management objectives to a level acceptable to the involved agencies.

Broad direction for land use allocation within the resource management area is facilitated by the refined Eastern Slopes zoning. The management intents, objectives and guidelines presented for each resource management area provide a more detailed framework for decision-making.

The intent of each resource management area is outlined as follows:

Area A: Livingstone-Upper Oldman

The primary intent is to provide a range of multiple use activities, including: non-motorized and limited summer/winter motorized recreation opportunities; protection of significant watershed, fisheries, wildlife and ecological resources; domestic grazing, timber production and harvesting.

Area B: West Livingstone

The primary intent is to provide a full range of multiple use activities managed to prevent adverse environmental impacts on watershed, fisheries, wildlife and recreation values in the area.

Area C: East Livingstone

North of the Chaffen-Bob divide and west of the Bob-Hawkeye divide, the primary intent is to provide a full range of multiple use activities managed to prevent adverse impact on the watershed, fisheries

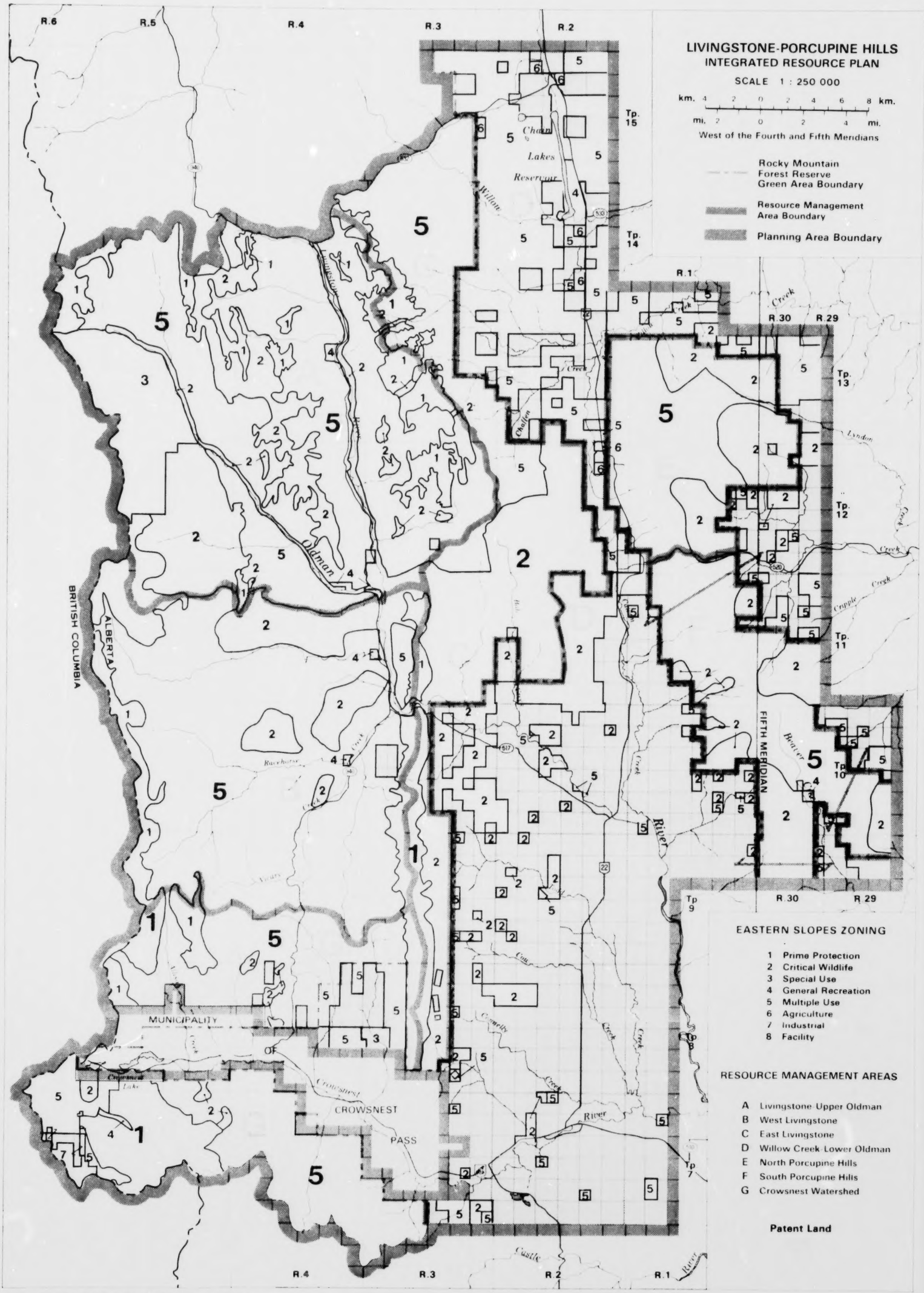


Figure 6 RESOURCE MANAGEMENT AREAS

and ecological resources. South of the Chaffen-Bob divide the primary intent is to protect critical wildlife habitat and ecological resources.

Area D: Willow Creek-Lower Oldman

The primary intent is to manage forage for domestic livestock and wildlife.

Area E: North Porcupine Hills

The primary intent of the North Porcupine Hills resource management area is to provide for range, recreation, and timber uses. Management activities related to oil and gas will strive to be compatible with this primary intent. All uses will be managed to prevent adverse environmental impacts on watershed, wildlife and ecological resources.

Area F: South Porcupine Hills

The primary intent is to provide a full range of multiple use activities managed to prevent adverse environmental impacts on watershed, wildlife and ecological resources.

Area G: Crowsnest Watershed

The primary intent is to provide a full range of multiple use activities managed to maintain high watershed quality, and to recognize the social and economic needs of the Crowsnest Pass.

4.1 Livingstone-Upper Oldman Resource Management Area A

The primary intent of the Livingstone-Upper Oldman resource management area (Figure 7) is to provide a range of multiple use activities, including non-motorized and limited summer and winter motorized recreation opportunities; protection of significant watershed, fisheries, wildlife and ecological resources; domestic grazing, timber production and harvesting.

Most of the resource management area has been designated Multiple Use (Zone 5) and Critical Wildlife (Zone 2). The multiple use emphasis of Zone 5 signifies these lands will provide a full range of available resources. Resource uses and activities in Zone 5, however, will be subject to recognized environmental standards and will lead to site-specific modifications to resource development programs as warranted. The importance of critical aquatic and terrestrial habitats is reflected through the use of Critical Wildlife (Zone 2). The location of these areas, species to be protected and the rationale is presented in Table 3.

The Prime Protection (Zone 1) designation generally conforms to the alpine and takes in portions of the subalpine that have high terrain sensitivity or possess fragile biological communities. The zone generally includes alpine meadows and tundra, krumholz and sparsely timbered areas, colluvial slopes, slopes of 45 degrees or greater adjacent to the alpine and high subalpine timber stands where these areas are adjacent to alpine areas.

The Beehive Natural Area, approved by order-in-council on April 2, 1987 has been designated Special Use (Zone 3).

Table 3
Critical Wildlife Zones in the Livingstone-Upper Oldman

Location	Target Species	Rationale
Sugarloaf	Elk	* Summer Range
Hidden Creek to Oldman River	Grizzly Bear Sheep Goats Elk	* Summer Range
Cabin Ridge	Sheep	* Winter and Summer Range
Deep Creek	Sheep	* Winter Range
Chaffen Ridge	Elk	* Winter Range
White Creek	Elk	* Winter Range * Migration Route
Oldman River (Fluvial Eco-section)	Mountain Whitefish Cutthroat Trout Rainbow Trout Bull Trout	* Spawning Areas * Overwintering Habitat * Migration
Livingstone River (Fluvial Eco-section)	Mountain Whitefish Cutthroat Trout Rainbow Trout Bull Trout	* Spawning Areas * Overwintering Habitat * Migration
Livingstone Range Pass	Elk	* Migration
Snake Creek	Elk	* Migration

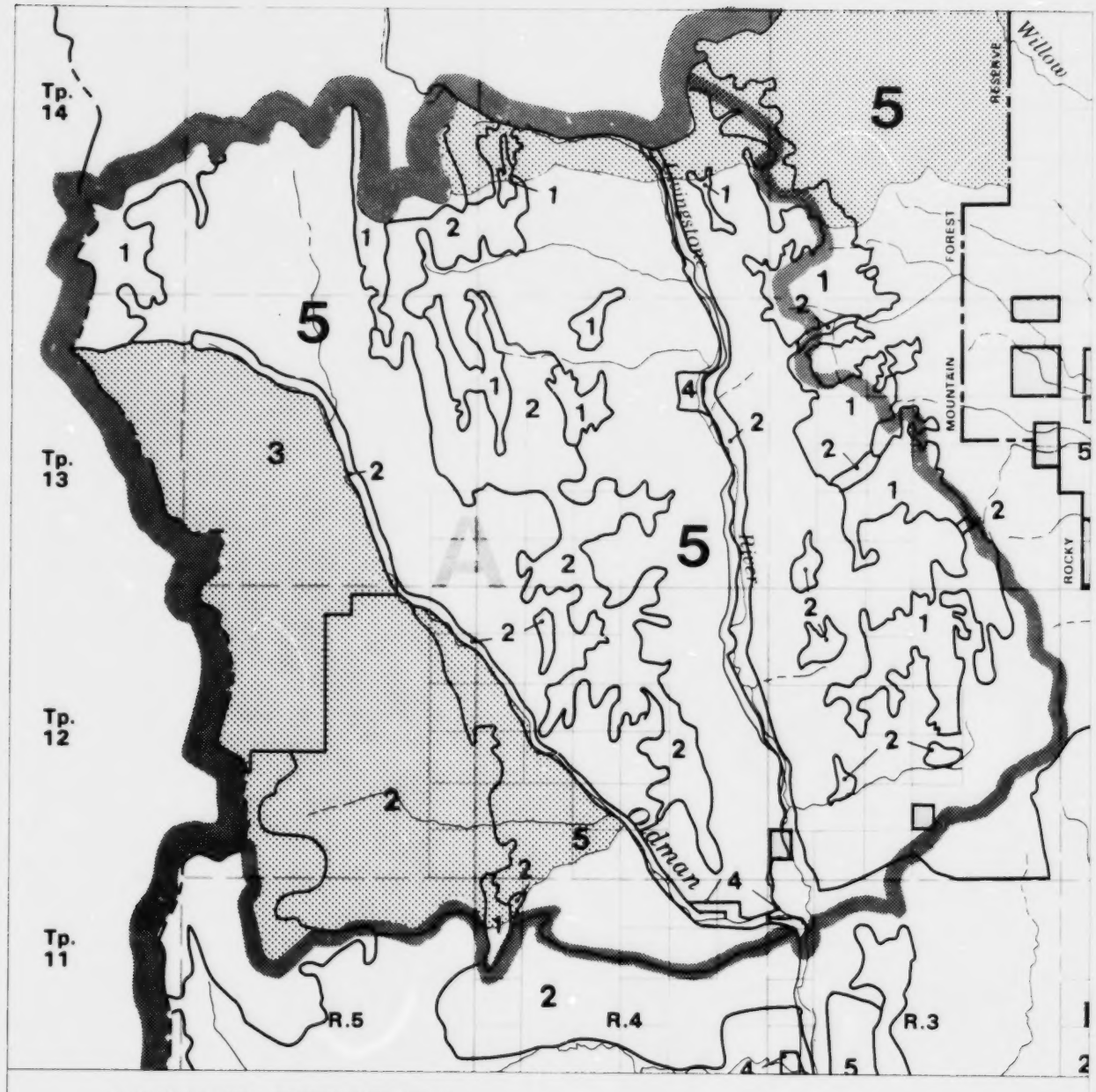


Figure 7 LIVINGSTONE - UPPER OLDMAN RESOURCE MANAGEMENT AREA

The Livingstone Falls and Oldman River recreation areas managed by the Alberta Forest Service are designated General Recreation (Zone 4). These sites generally conform geographically to existing Alberta Forest Service recreation areas and are managed for intensive recreation. The Joining Rivers site has been designated Zone 4 in anticipation that demand will warrant intensive recreation development in the future.

The broad resource management objectives and guidelines stated in Section 2 apply to this resource management area. For brevity, they have not been repeated. Only resource management sectors with more detailed or specific objectives and guidelines are listed. The objectives provide a concise statement of a desirable condition or state for a resource or resource use. The guidelines describe a course of action to achieve these objectives. No priority is intended or implied by the sequence of objectives and guidelines.

Watershed

The Livingstone-Upper Oldman area includes the headwaters basins of the Oldman and Livingstone rivers. The terrain is mountainous, with north-south trending mountain ranges separated by broad, rolling till plains in the western part of the area and the valley of the Livingstone River in the eastern part.

Parent materials in mountainous terrain consist of talus and weathered bedrock, with bedrock outcrops occurring at higher elevations. Till deposits are found at lower elevations, and coarse gravels occur along valley bottoms.

The vegetation is influenced by elevation and parent materials and ranges from alpine meadows to subalpine forests. The forest at timberline is typically a mixture of spruce and fir, with sparse cover of grasses and lichens at higher elevations. At lower elevations, spruce-fir forest is characteristic of soils developed from locally weathered bedrock. Grassy meadows are common on ridgetops at lower elevations adjacent to the Livingstone River. Willow shrublands and stands of white spruce are common along stream courses, while pine forest and grasslands are found on terraces along the Livingstone River where parent materials are coarse and rapidly drained.

Environmental sensitivity is high in the mountainous areas because of steep slopes that are prone to mass wasting and materials that are susceptible to erosion. Rolling lower slopes and till plains are moderately sensitive to erosion. The valley bottoms of the Oldman and Livingstone rivers have high environmental hazard due to flooding and environmental sensitivity due to potential for stream siltation.

There are four reclamation projects proposed for the resource management area. The projects involve the reclamation of seismic lines in the Ridge Creek, Beaver Creek and Deep Creek areas associated with

Zone 1 of the Eastern Slopes Policy and access in the Hidden Creek area. A portion of the proposed Beaver Creek reclamation project overlaps into the East Livingstone resource management area.

Resource Management Objectives

1. The broad watershed management objectives apply.

Resource Management Guideline

1. Reclamation projects proposed for the Ridge creek, Beaver Creek and Deep Creek areas will be evaluated and undertaken subject to reclamation policies and funding according to availability and provincial priorities. Access in the Hidden Creek area will be reclaimed following the timber harvesting operation in the area.

Recreation

Two formal campgrounds, the Livingstone Falls and Oldman River recreation areas, are located in this resource management area. Both provide camping and picnic facilities and the Oldman River recreation area contains an equestrian staging/group camp area. Both facilities tend to be used to, or exceed, capacity on weekends. A Class 1 Commercial Trail Riding Area has been established in the resource management area.

Random camping and the use of recreational off-highway and off-trail vehicles have had impacts in the more sensitive areas in the resource management area. At present, this form of recreational activity occurs at moderate levels. Snowmobilers use existing trails, particularly in the Oldman-Livingstone riparian Zone 2 areas, for long distance touring. Some of these trails afford access to, and from, the Cataract Creek Forest Land Use Zone in Kananaskis Country. There are no formal trails for hiking/backpacking with the exception of the Great Divide Trail located in the alpine-subalpine interface along the High Rock Range.

Generally, emphasis for recreation will be placed on dispersed, predominantly non-motorized uses, with a degree of formal recreation facility development.

Resource Management Objectives

1. To maintain or upgrade existing formal intensive recreation facilities as required.

2. To ensure snowmobile excursion routes are retained in the resource management area.

3. To maintain a variety of non-motorized recreational opportunities with a major focus on the hiking and equestrian opportunities in the Chaffen-Horseshoe Ridge Area.

4. To examine the nature and degree of random camping and determine whether random camping impacts on sensitive areas merit further attention.

Resource Management Guidelines

1. Recreational planning would include the ongoing maintenance of the Livingstone Falls recreation area. The Oldman River recreation area is under consideration for relocation. A base camp for the commercial trail riding area is anticipated, with possible location in the Coat Creek area.

2. Snowmobile excursion routes will be retained along the Upper Oldman and Livingstone valley zone 2s, and will be incorporated in the access management plan.

3. Areas identified as having potential for future recreation development over the long term include the Honeymoon Creek area for equestrian staging; Northwest Branch Falls site for day use; Lyall Lakes, Deep Creek and White Creek for remote camping; and Mt. Gass for hiking.

4. Random camping sites along the Northwest Branch road will be examined to determine levels of use and site impacts. Should the impacts of random camping and site conditions merit further attention, site rehabilitation or closure may be considered as mitigative measures.

Tourism

The Livingstone-Upper Oldman resource management area contains the Forestry Trunk Road. As well as becoming a popular auto-touring route, this road provides a certain amount of access to off-highway vehicles, creating conflicts between recreationists who use motor vehicles for access and those who do not. As a result, commercial recreation operators such as trail riding outfitters are not using areas like the Oldman Valley and Cabin Ridge for their operations.

There is potential to increase the extensive wildland recreation market in specific areas of this resource management area. The Beehive Natural Area is a notable example.

Resource Management Objectives

1. To encourage water-based recreation activities on and scenic enjoyment of the Oldman and Livingstone rivers.

2. To encourage commercial adventure product operators (particularly trail riding operations) to increase use of this area.

3. To recognize the Forestry Trunk Road as an important auto touring route.

4. To develop scenic viewing areas and rest stop facilities in association with scenic touring opportunities.

Resource Management Guidelines

1. Planning assistance will be provided to any private sector operator interested in providing tourist services or adventure products in this resource management area.

2. Alberta Tourism will provide tourism data for input to an access management plan or recreation plan at the request of the Alberta Forest Service. The information will be based upon known tourism trends and proven markets for the Livingstone-Porcupine Hills planning area.

Ecological Resources

The Beehive Natural Area, approved by order-in-council on April 2, 1987, occupies 67 km^2 (26 mi^2). Within the area over 2 000 acres of pristine, old growth forests are protected. These forests may be over 1 000 years old, with individual trees as old as 300 years. The Beehive Natural Area also provides habitat for grizzly bear, summer range for elk and lambing sites for bighorn sheep. Overall the area has a high standard of wilderness quality and aesthetic value that is worthy of protection.

The Beehive Natural Area provides the land base for a wide range of recreational activities and is used and highly valued.

The following objectives and guidelines apply to the Beehive Natural Area.

Resource Management Objectives

1. To conserve the natural features in a natural state for public appreciation and education, and for low-intensity recreation.

2. To maintain the biological diversity, including a full range of forest types and age classes, and habitats for both game and non-game animals.

Resource Management Guidelines

1. A management plan will be prepared by the Alberta Forest Service for the Beehive Natural Area.

2. Sanitation cutting, defined as a treatment to remove dead, diseased, infested, damaged or susceptible trees to reduce or prevent the spread of insects or pathogens, will be permitted for management purposes according to conditions established in the management plan, with proper referral.

3. Passive, non-facility-oriented recreation will be permitted, including fishing, hunting, primitive camping, hiking and riding.

4. No motorized vehicles will be permitted except for management purposes. No recreation access and associated infrastructure such as bridges, cutlines or roads will be provided as these would encourage unauthorized motor vehicle use.

5. No commercial or industrial activities will be allowed except for trapping and outfitting.

6. The only agricultural activity to be permitted is grazing, which could continue at approximately current levels under appropriate management guidelines.

7. Range improvement will be prohibited except where required for wildlife management (e.g., reduce brush encroachment).

8. Introduction of non-native species will not be permitted.

9. No minerals exploration or development activities will be permitted.

Historical Resources

Historical resource inventories have been limited within the management area. A significant number of prehistoric sites have been identified along the Upper Oldman and Livingstone rivers and a small portion of White Creek. The potential for additional discoveries being made is considered to be high, in a variety of topographical situations throughout the planning area. Although there are no major passes in the area, access into the Fording River Valley of British Columbia is available near Mount Gass and Beehive Mountain. These access routes may well have been used prehistorically as the Oldman River Valley was a major travel corridor between the plains and the interior of British Columbia. Prehistoric sites may well be present in these high elevation areas, particularly in alpine meadows, reflecting summer use of locally available plant and animal communities. In addition, terraces above

streams and rivers, the shores of small lakes, open grassy areas and areas where stone suitable for tool manufacture is surficially exposed are all considered to have high potential for prehistoric site occurrences. Prehistoric occupation of the area may date back to greater than 12 000 years.

At present, very little work has been done on the palaeontological resources of the region. However, these resources are widespread and varied and there is potential for fossils virtually anywhere that strata is exposed. Areas of high potential are considered to include exposures along streams and rivers as well as steep slopes and ridges above the tree line, and in man-made excavations such as coal mines or along major roadways.

The region was the focus for early coal mining, ranching and forestry activity. The remains of several of these sites may exist throughout the resource management area.

Resource Management Objective

1. The broad historical resource objective applies within this resource management area. Specific objectives were not identified.

Resource Management Guideline

1. The Archaeological Survey of Alberta will participate in the land use referral process to review any proposed developments involving land surface disturbance on lands adjacent to the Livingstone and Oldman rivers and all their tributaries.

Wildlife

The Livingstone-Upper Oldman resource management area contains key habitats for elk and sheep summer and winter range. Summer use by elk and sheep is high, particularly in the Cabin Ridge-Upper Oldman, Beehive and Hidden Creek areas. Winter ranges critical for sheep are found on Cabin Ridge and on the Livingstone Range. Some elk winter range is also found in the resource management area; most of current elk winter range is located in eastern resource management areas and elk migrate through several passes to reach suitable ranges. Potential exists to enhance summer range for ungulates and to improve winter ranges, primarily through vehicle access controls. This resource management area offers non-motorized recreational hunting opportunities.

Resource Management Objectives

1. To increase the number and distribution of elk, sheep and goats using the resource management area on a year-round basis. To promote elk and sheep winter use of former, under-used or current wintering areas. To encourage the increase or re-establishment of goat populations on vacant or underutilized ranges.

2. To maintain recreational hunting opportunity, commercial trapping opportunity and non-consumptive uses of wildlife resources.

3. To develop land management strategies promoting the wildland qualities of the resource management area to provide for non-motorized recreational hunting opportunities, and to maintain high quality grizzly bear habitat.

4. To reduce the negative impacts of land use activities on wildlife and wildlife habitat.

5. To maintain current numbers and distribution of other wildlife species through the maintenance of a diversity of habitat types.

6. To maintain a forage base capable of sustaining the following wildlife populations:

   Sheep - 113 in summer and 38 in winter

   Goats - 40

   Elk - 350 in summer and 48 in winter

   Mule Deer - 750 in summer and 150 in winter

   White-Tailed Deer - 100 in summer

   Moose - 75 in summer and 25 in winter

Resource Management Guidelines

1. The Fish and Wildlife Division will assess vegetative changes (succession-invasion) on traditional use areas and current and potential carrying capacities. Plans will be reviewed with the Alberta Forest Service for timber removal, controlled burns, fertilization or access control to enhance the quality and quantity of historical winter ranges for sheep and elk.

2. The quality, quantity and security of elk summer range will be enhanced through integration of logging plans with the Alberta Forest Service, selection of vehicle access routes, reduction of impact of land use activities through timing constraints, access closures or mitigation and assessment of range improvement techniques.

3. An assessment should be undertaken by the Fish and Wildlife Division of opportunities for the increase and expansion of

mountain goat populations, primarily through transplants. This will allow a limited goat harvest and will increase opportunity for recreational hunting.

4. The Fish and Wildlife Division will continue to conduct regular surveys of priority species to assess management, development or protective requirements.

Fisheries

The Livingstone-Upper Oldman resource management area contains the Livingstone River and part of the Oldman River, both of which are provincial Class 1 trout fisheries. Sport fishing of these rivers and their tributaries is an important component of the area. Maintenance of high quality watershed values is required within the area to protect a significant fisheries resource and recreational angling opportunities.

Resource Management Objectives

1. To maintain a high quality water supply of sufficient quantity for sport fish production.

2. To protect the integrity of aquatic and riparian habitats critical for continued sport fish production, primarily spawning, rearing, overwinter habitats for cutthroat trout, bull trout, rainbow trout, mountain whitefish in the Livingstone River and its tributaries and in the Oldman River and its tributaries.

3. To recognize and protect the provincial Class 1 stream status of the Livingstone and Oldman rivers.

4. To maintain current population levels and high productivity in sport fish populations.

5. To maintain current angler days of recreational fishing. To increase, where possible, recreational fishing opportunities.

Resource Management Guidelines

1. Recreational fishing opportunities should be increased, when demand warrants, by stocking suitable barren waters with cutthroat trout. Current opportunities will be improved through selected stream habitat enhancement techniques.

2. The Fish and Wildlife Division, in conjunction with the Alberta Forest Service, will identify roads and stream crossings to eliminate water quality problems (siltation) through appropriate maintenance, reclamation or road closure.

3. The Fish and Wildlife Division will continue to conduct regular surveys of streams to assess management requirements, angler use, habitat development potential and habitat protection needs.

Timber

The merchantable timber resources in the Livingstone-Upper Oldman resource management area are predominately in the mature to overmature age-classes with some stands in excess of 300 years. Of the commercial species, pine is slightly more prevalent than spruce. The occurrence of balsam fir in the understory of spruce stands indicates the advent of climax forest conditions. Some instances of forest deterioration have been noted along the northwest branch portion of the Oldman River.

The prevalence of mature and overmature timber in the RMA and the trend toward decadent stand conditions, has resulted in this area being identified as a priority for commercial timber harvesting. In fact, the Livingstone-Upper Oldman resource management area contains large portions of the coniferous timber quota spheres of interest held by Atlas Lumber (Alberta) Ltd. and Johnson Brothers Sawmills Ltd. There is a significant volume of timber to be harvested from the Johnson Brothers sphere of interest area in the next five to seven years from the Hidden Creek and Pasque/Oyster/Straight Creek drainages. The timber volume available from these two drainages is very important in terms of the overall timber commitments in the C5 Unit. There are no alternative timber sources available within the area for this quota.

Atlas Lumber (Alberta) Ltd. is not scheduled to commence operations in the Livingstone-Upper Oldman resource management area for 15 to 20 years. Timber harvesting operations under this quota will concentrate in areas along the northwest branch road.

The forest management strategy for RMA A also recognizes the need to maintain healthy and stable forest conditions in those areas where commercial operations are not permitted. Treatments will be concentrated in decadent and deteriorating stands in an effort to stabilize forest conditions.

Resource Management Guidelines

1. To provide a continuous supply of timber to satisfy existing forest industry commitments.

2. To maintain stable forest conditions in those portions of the RMA not identified for commercial timber harvesting.

Resource Management Guidelines

1. Timber harvesting operations will be located in the Hidden Creek, White Creek, Isolation/Coat Creek and Pasque/Straight/

Oyster Creek areas and areas along the northwest branch road, from Slacker Creek to the confluence of the Oldman and Livingstone rivers.

2. Timber management plans will integrate the Great Divide Trail system with harvesting and reforestation in the vicinity of the trail.

3. In the Hidden Creek and Pasque/Oyster/Straight Creek areas, stringent operating conditions will be applied to all timber harvesting dispositions to ensure the protection of the watershed, wildlife habitat, recreation and ecological resource values of this area.

4. There will be no commercial logging in the Beehive Natural Area.

5. Forest protection (fire, insect and disease control) will be carried out in accordance with provincial legislation and Alberta Forest Service policies.

Range

There are three grazing allotments within this resource management area; Savanna Creek, Upper Livingstone and Lower Livingstone. The permitted stocking rate in the resource management area is estimated at 2 209 AUMs. The emphasis for range management will be placed on maintaining existing grasslands; however, an estimated 162 hectares (400 acres) of range improvement will be required to maintain the specified grazing level and will be identified through range management plan revisions.

Resource Management Objective

1. To provide a forage base that is capable of supporting an estimated 2 209 AUMs.

Resource Management Guideline

1. The existing forage base will be maintained, for the most part, by managing existing grasslands to their fullest potential. Over the long term an estimated 162 hectares (400 acres) of range improvement will be required to maintain the range resource. Revised range management plans and subsequent range development plans will be required when range improvements are necessary.

   For grassland and swamp birch areas, such plans could include interseeding, re-grassing, and prescribed burning to improve the production of palatable forage.

Minerals

One-third of the Crown's coal rights in the Livingstone-Upper Oldman resource management area are leased. The resource management area contains the entire Oldman River and Beaver Creek coal fields as well as the southern half of the Savanna Creek coal field. The established remaining, recoverable reserves total 300 megatonnes (estimation based on Energy Resources Conservation Board Report ST 87-31). These surface and sub-surface coal reserves extend throughout more than 25 per cent of the resource management area. There have not been mining operations in this area, although interest in coal continues.

About half the Savanna Creek natural gas field extends into the northern end of the Livingstone-Upper Oldman resource management area. Although the field covers only five per cent of the resource management area, about 15 per cent of the area is disposed in the form of petroleum and natural gas leases. The Savanna Creek field, discovered in 1954, is producing Rundle formation gas at a rate of 78 x $10^6 m^3$/year currently thereby requiring 20 years to exhaust the remaining recoverable reserves which amount to 1 815 x $10^6 m^3$ for the field in its entirety, or 998 x $10^6 m^3$ for the portion in the plan (ERCB Report ST 86-18; assuming reserves are evenly distributed throughout the field).

Natural gas is being recovered from three of nine wells in the resource management area. Another well is capped gas and five others were drilled and abandoned.

The natural gas reserves in the Savanna Creek field are sour, containing significant concentrations of hydrogen sulphide (H2S). This component of the raw gas is extremely toxic, requiring that extra safety measures be applied during all phases of drilling and development. Processing of the gas can reduce the sulphur to its elemental state which is a useful and saleable commodity. As of December 31, 1981 the Energy Resources Conservation Board (ERCB report 82-12) estimated the remaining established sulphur reserves recoverable from the Savanna Creek gas field to be 512 x 10^3 tonnes.

Interest has also been expressed for metallic minerals in this resource management area. Some believe that the Lost Lemon gold mine is located in the vicinity of the northern boundary of the planning area. The only explored occurrence of metallic minerals is situated on Mount Gass, where periodic interest results in some exploration and geologic evaluation.

The sand and gravel (aggregate) resources of the resource management area have not been inventoried. Potential for sand and gravel deposits however, generally corresponds with glacio-fluvial zones found in the Ecological Land Classification (Alberta 1979). Nearby access infrastructure (e.g. roads, rail) must be in place to make the mining of aggregate deposits economically feasible. The Livingstone River Valley

bottom and the valley bottom at confluence of the Livingstone and Oldman rivers have a high potential for aggregate. Proximity of potential deposits to Secondary Road 940 makes mining feasible.

Resource Management Objectives

1. To provide opportunities for the exploration of coal to the extent necessary to prove the value of the resource to the province, and to consider coal developments if exploration results, environmental factors and economic conditions prove it feasible.

2. To provide opportunities for the orderly exploration and development of hydrocarbons.

3. To provide opportunities for industry to define the limits of, and recover the reserves within the productive geologic structures of the Savanna Creek gas field particularly since there is an existing commitment to its development under A Policy for Resource Management of the Eastern Slopes, revised 1984.

4. To provide opportunities for the exploration for and development of aggregate, quarriable and metallic mineral resources.

Resource Management Guidelines

1. The Oldman Valley and Livingstone Valley Zone 2 areas play a significant role in the management of the recreation resources in these portions of the resource management area. These valleys may also play an important part in the processing and transportation of mineral resources in areas adjacent to but not in the valleys. Oil and gas geophysical assessments would be permitted. Minerals development will be prohibited, with the exception of processing/transportation facilities, the appropriateness of which will be determined by the normal approvals process. Access for the purposes of mineral development that originates from or crosses these Zone 2s, would be allowed provided it is constructed in an environmentally suitable manner.

2. Minerals exploration and development will not be permitted in the Beehive Natural Area (Zone 3) because of the importance of this area for extensive recreation and ecological values.

3. In view of the significance of Critical Wildlife (Zone 2) lands in the Livingstone-Upper Oldman area for elk, sheep, goats and grizzly bear, restrictions on the timing and extent of mineral exploration activity, access control and special reclamation standards or mitigation will be necessary to minimize adverse impact on wildlife.

4. Development of petroleum and natural gas resources will be permitted in the upland Critical Wildlife Zones. All development proposals must address the potential impacts on critical wildlife habitat and disruptions to populations as well as recreation values by providing for impact mitigation and appropriate reclamation. Operating guidelines will consider access restrictions, low duration and intensity of development and complete reclamation or mitigation.

5. Coal exploration will be permitted in upland Zone 2s within the resource management area. Any subsequent development of the coal resource will be determined through a preliminary disclosure and regulatory approvals. Potential wildlife management conflicts arising from coal exploration or development in the upland Zone 2 areas must be mitigated as a condition of approval.

6. Coal exploration will be permitted on existing coal dispositions in the Sugarloaf, Pasque Mountain and Isolation Ridge Zone 1 areas.

7. Development of metallic, quarriable and aggregate minerals will not be permitted in upland Critical Wildlife Zones due to the critical nature of wildlife habitat and present use of the resource management area for extensive recreation.

8. Localized geophysical activity and "step out" drilling may be permitted in the Zone 1s on a very limited scale and under stringent operating conditions which it is deemed justified in order to define the limits of, or recover the reserves within the Savanna Creek gas play.

Access

The use of recreational off-highway vehicles has had considerable impact on the more sensitive areas within the resource management area including Livingstone Range, Cabin Ridge, Chaffen Ridge, Horseshoe Ridge and the Beehive Mountain area. An access management plan is needed for this resource management area.

Resource Management Objective

1. The broad access management objectives apply.

Resource Management Guidelines

1. An access management plan will be initiated for this resource management area where summer and winter recreational off-highway vehicle use will be directed to selected trails and roads. Recreational off-highway vehicle use will be monitored to determine whether further mitigative measures are necessary.

2. A forest land use zone or equivalent regulation is proposed to control and direct motorized recreational access to designated routes and trails in the Dry Creek and North Twin/South Twin drainages.

3. A forest land use zone or equivalent regulation is proposed (Figure 7) to protect watershed and ecological resources in the Beehive Natural Area and watershed and wildlife resources in the Hidden Creek drainage west of the Oldman River.

Implications of Resource Management Actions

Recreation

1. The Livingstone-Upper Oldman resource management area is a popular destination for dispersed extensive recreation opportunities. Management emphasis will subsequently be placed on the maintenance of non-motorized recreational opportunities throughout back-country areas. Summer and winter motorized recreation opportunities will be maintained on a limited basis. A degree of formal recreation facility development will be maintained along valley bottom access roads.

2. Provisions have been made in the resource management area to accommodate the Great Divide Trail.

Fisheries and Wildlife

1. Reclamation projects for trails will reduce sediment loads to streams and rivers and will enhance fisheries values. Reclamation of trails will result in reduced harassment of wildlife and will increase the security of wildlife ranges.

2. Potential for coal development exists in the resource management area. Development of the coal reserves will have an adverse impact on habitat critical for sheep and elk, and will result in improved access. A decline in ungulate populations through reduced carrying capacity, harassment and increased harvest could occur. An increase in sediment loading will reduce provincially significant sport fishing opportunities.

3. Further development of gas reserves could seriously conflict with objectives to reclaim existing access trails and to develop an access management plan to benefit wildlife populations.

4. Co-operative planning with the Alberta Forest Service for timber harvest and related access development could benefit wildlife populations by enhancing existing critical ranges and other ranges through increased forage availability.

5. Management of off-highway recreation vehicles could enhance wildlife populations by limiting harassment on key or critical ranges, provide better quality hunting opportunities and could reduce water quality problems related to siltation.

Minerals

1. The decision to recognize all alpine terrain as Prime Protection means the plan will establish five new areas of Zone 1 located on and around Pasque Mountain, Cabin Ridge, Isola Peak and Sugarloaf Mountain. These areas are currently under Category 2 of the Coal Policy which does not normally consider surface mining and permits limited coal exploration under strict conditions. In the rezoned areas there will now be sterilization of the underground as well as the surface minable reserves and coal exploration will not be permitted except where specific provisions have been made on existing coal leases. It remains to be determined whether these new restrictions will render development of the southern half of the Savanna Creek and the northern part of the Oldman River coal fields impractical. Developments have not occurred in the past and are not foreseen in the near term. Still, compensation claims may be anticipated on coal leases 6617, 6619, 6495 and 1386120008. A claim has already been received on 7269, 7270, 7271 but it is based on the prohibition of coal activities in Kananaskis Country.

2. The exclusion of mineral resource activities, except for geophysical assessments, from the Oldman River and Livingstone River Zone 2s, will mean the sterilization of underground mineable coal reserves. Surface coal reserves are already inaccessible in these areas, and have been since 1976, as they fall under Category 2 of the Coal Policy. It remains to be determined whether this additional sterilization will render development of the Beaver Creek and western fringe of the Oldman River coal fields impractical. Developments have not occurred in the past and are not foreseen in the near term. Compensation claims may be anticipated for six coal leases (6616 and 6614 - Livingstone River; 6502, 6500, 6942 and 6941 - Oldman River). Portions of 19 quarter sections of freehold mineral areas will become inaccessible.

   The guideline will also have the effect of nearly tripling the normal oil and gas drilling setback from these rivers. Existing oil and gas dispositions are not affected as none fall within this area.

3. The exclusion of mineral resource activities from the Beehive Natural Area bears no implications other than that of lost opportunity on an additional 18 km^2 (7 mi^2) of land that lies beyond the existing Eastern Slopes Policy Zone 1 boundary. RMA-A

There are no dispositions for minerals in this area but the lack of exploration means the mineral potential is largely unknown.

4. The creation of the Hidden Creek Zone 2 and the diminished size of the Cabin Ridge Zone 2 will offset each other in terms of the area on which more stringent operating conditions for oil and gas activities may be applied.

Access

1. Access control in the Beehive and Hidden Creek areas will help to perpetuate watershed, wildlife and ecological resources found there.

2. Access control in the Dry and North/South Twin Creeks area will effectively mitigate adverse impacts of high recreational off-highway vehicle use. Recreational off-highway vehicle use will be directed to selected roads and trails throughout the control area.

4.2 West Livingstone Resource Management Area B

The primary intent of the West Livingstone resource management area (Figure 8) is to provide a full range of multiple use activities managed to prevent adverse environmental impacts on watershed, fisheries, wildlife and recreation values in the area.

The vast majority of the West Livingstone resource management area has been designated Multiple Use (Zone 5). Lands under this designation will provide for the management and development of the full range of available resources. Watershed protection will continue to be a priority in this, as in other, Eastern Slopes zones. Therefore resource uses and activities in Zone 5 will be consistent with recognized environmental standards. In addition to the range of industrial resources present, Zone 5 lands in the West Livingstone resource management area also provide recreational benefits closely associated with wildlife, fisheries and aesthetic values. Site-specific modifications to resource development programs may subsequently be required to ensure these values are perpetuated.

The Critical Wildlife Zone serves to identify several areas in the West Livingstone area crucial to the survival of aquatic and terrestrial species. The location of this zone, key species to be protected and the rationale for its use are provided in Table 4.

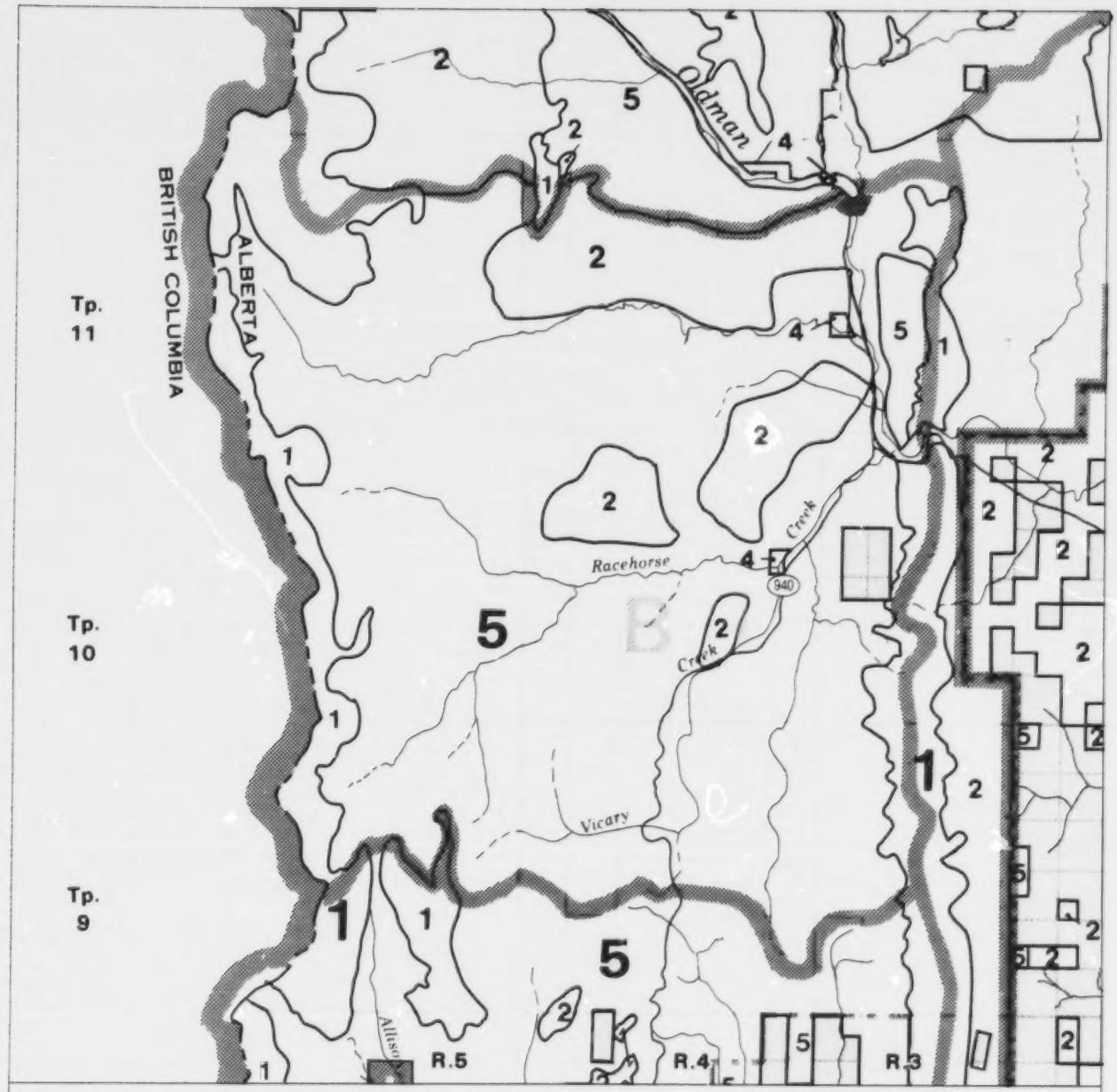


Figure 8 WEST LIVINGSTONE RESOURCE MANAGEMENT AREA

Table 4

Critical Wildlife Zones in the West Livingstone

Location	Target Species	Rationale
Vicary Creek	Elk	* Winter Range
Wintering Creek	Elk	* Winter Range
Flyhill	Elk	* Winter Range
Oldman River (Fluvial Eco-section)	Mountain Whitefish Cutthroat Trout Rainbow Trout Bull Trout	* Spawning Areas * Overwintering Habitat * Migration
Sugarloaf to Secondary Road 940	Elk	* Winter and Summer Range * Migration

The Prime Protection Zone generally conforms to the alpine and includes portions of the sub-alpine that have high terrain sensitivity.

Two formal recreation facilities managed by the Alberta Forest Service will serve as a focus for a intensive recreation opportunities. The existing sites along Dutch and Racehorse creeks are designated General Recreation.

The broad resource management objectives and guidelines stated in Section 2 apply to this resource management area. For brevity, they have not been repeated. Only resource management sectors with more detailed or specific objectives and guidelines are listed. The objectives provide a concise statement of a desirable condition or state for a resource or resource use. The guidelines describe a course of action to achieve these objectives. No priority is intended by the sequence of objectives and guidelines.

Watershed

The West Livingstone area includes headwater basins of north-flowing tributaries to the Oldman River. Relief is higher and the terrain more rugged here than in the Livingstone-Upper Oldman area to the north. Locally weathered bedrock is the most common parent material across the area, with extensive till deposits found at the base of the High Rock Range.

The vegetation is predominantly subalpine and similar in pattern to Livingstone-Upper Oldman resource management area.

Environmental sensitivity is moderate across most of the area, to high associated with steep slopes with erodible soils in mountainous areas and the possibility of floods along valley bottoms. Till deposits at the front of mountain ranges have moderate sensitivity to erosion except in areas of steep (>35 per cent) slopes, where sensitivity is high.

Resource Management Objective

1. The broad watershed management objectives apply.

Resource Management Guideline

1. The broad watershed management guidelines apply.

Wildlife

The West Livingstone resource management area contains key habitats for elk. Recreational hunting and commercial trapping are important components. Winter ranges for sheep are found along the Livingstone Range. Racehorse Creek and Dutch Creek valleys contain critical winter range for elk as well as summer range. Resource developments, primarily logging, have provided potential for increases in ungulate populations and for shifts in winter/summer distribution patterns; however, vehicle access controls are required to secure these ranges in the headwaters of Racehorse and Dutch creeks.

Resource Management Objectives

1. To increase the number and distribution of elk, sheep, moose and goats using the resource management area on a year-round basis.

2. To promote elk and sheep winter use of former underutilized or current underutilized wintering areas.

3. To encourage the increase or re-establishment of goat populations on vacant or underutilized ranges.

4. To promote forest management practices to enhance moose habitat.

5. To maintain recreational hunting opportunity, commercial trapping opportunity and non-consumptive uses of wildlife.

6. To develop a land management strategy for parts of the resource management area to promote wildland qualities for recreational hunting (i.e., non-motorized access).

7. To reduce the negative impacts of land use activities on wildlife and wildlife habitat.

8. To maintain current levels of abundance and distribution of other wildlife species by maintaining diverse habitat types.

9. To maintain a forage base capable of sustaining the following wildlife populations:

   Sheep - 30 in summer and 15 in winter.

   Goats - 35

   Elk - 265 in summer and 100 in winter

   Mule Deer - 450 in summer and 50 in winter

   White-Tailed Deer - 100 in summer

   Moose - 75

Resource Management Guidelines

1. The Fish and Wildlife Division will assess vegetation changes (succession, invasion) on traditional use areas; current and potential carrying capacities will be assessed. Plans will be reviewed with the Alberta Forest Service for timber removal, controlled burns, fertilization or access control to enhance the quality and quantity of historical winter ranges for sheep and elk.

2. The quality, quantity and security of elk summer range and moose range will be enhanced through integration of logging plans with the Alberta Forest Service, selection of vehicle access routes, in parts of the resource management area reduction of impact of land use activities through timing constraints, access closures or mitigation and assessment of range improvement techniques.

3. An assessment of opportunities to increase and expand mountain goat populations primarily through relocation should be undertaken by the Fish and Wildlife Division.

   This will allow a limited goat harvest and will increase opportunity for recreational hunting.

4. The Fish and Wildlife Division will continue to conduct regular surveys of priority species to assess management, development or protective requirements.

Fisheries

The West Livingstone resource management area contains a part of the Oldman River, a provincial Class 1 status trout stream as well as several other smaller, but popular and productive streams such as Racehorse, Dutch, Vicary and Daisy creeks. Sport fishing of streams in the resource management area is popular; maintenance of high quality watershed values in resource development is critically important to protect the significant fisheries and high recreational angling.

Resource Management Objectives

1. To maintain a high quality water supply of sufficient quantity for sport fish production.

2. To protect the integrity of aquatic and riparian habitats critical for continued sport fish production, primarily spawning, rearing and overwintering areas on the Oldman River, Dutch Creek, Racehorse Creek and its tributaries.

3. To maintain current population levels and high productivity in sport fish populations.

4. To maintain current angler days of recreational fishing. To increase, where possible, recreational fishing opportunities.

5. To recognize and protect the provincial Class 1 stream status of the Oldman River.

Resource Management Guidelines

1. Alberta's Eastern Slopes' stream fishery management program will be assessed on Dutch Creek at 10-year intervals to determine whether any changes in fisheries management are warranted.

2. Recreational fishing opportunities will be reviewed, when demand warrants, by stocking suitable barren waters with cutthroat trout. Current opportunities should be improved through selected lake and stream habitat enhancement techniques.

3. The Fish and Wildlife Division, in conjunction with the Alberta Forest Service, will identify roads and stream crossings to eliminate water quality problems (siltation) through appropriate maintenance, reclamation or road closure.

4. The Fish and Wildlife Division will continue to conduct regular surveys of streams and lakes to assess management requirements, angler use, habitat development potential and habitat protection needs.

Recreation

There are two formal recreation facilities in this resource management area. They are Racehorse Creek and Dutch Creek forest recreation areas. Racehorse Creek and Dutch Creek forest recreation areas provide campground and day use facilities. Resource development in this resource management area has created a higher degree of access when compared with other resource management areas. As with most of the planning area, recreational pursuits such as hunting and fishing are prevalent. Off-highway vehicle use and random camping occur to higher degrees in the resource management area as a result of improved access.

Opportunities for dispersed, motorized recreational pursuits and the maintenance and upgrading of formal recreation facilities will be emphasized. Informal use of existing trails for both summer and winter off-highway vehicle use as well as random camping will also be considered in this resource management area.

Resource Management Objectives

1. To maintain and upgrade existing recreation facilities as required.

2. To provide opportunities for dispersed recreational activities with provision for motorized recreation where this use is compatible with other land uses and environmental constraints.

Resource Management Guidelines

1. Areas identified as having potential for recreational development over the long term include: Window Mountain Lake, Daisy Creek and the Gap for hiking; Racehorse Creek for an off-highway vehicle staging area; Dutch Creek area east of the Livingstone River for a cross-country skiing trailhead and trails; and the Dutch Creek area west of the Livingstone River and Racehorse Bridge areas for snowmobile trailheads and trails.

Tourism

The Forestry Trunk Road is the main visitor access into the area stretching from the Crowsnest Watershed area, north into the Livingstone Gap. The Trunk Road offers many scenic viewpoints and is used by non-residents for pass through travel.

Extensive recreation is the primary recreational use in the area. Recreation facilities are limited to Alberta Forest Service campgrounds but there may be sufficient demand to identify future sites for staging areas or to incorporate the need for staging into the existing campgrounds.

Resource Management Objectives

1. To recognize the Forestry Trunk Road as an important auto touring route.

2. To recognize the focus of the area as extensive recreation and its potential for development of recreational staging areas.

Resource Management Guidelines

1. Any future major road upgrading plans for the Forestry Trunk Road should consider the development of scenic viewing pull off areas.

2. Alberta Tourism will assist, where appropriate, in the identification of potential staging areas in the resource management area.

Historical Resources

Historical resource inventories conducted in the resource management area have not been systematic; however, these studies have identified dense concentrations of prehistoric sites along some of the major drainage systems including the Oldman River and Dutch, Racehorse and Daisy creeks. A series of intermontane passes exist in this area which undoubtedly provided important travel corridors between the Oldman drainage system and the Elk-Kootenay River systems of British Columbia. These include Tornado, North Fork and Racehorse passes. Prehistoric sites have been identified at the summits or along the approaches to some of these passes and it is expected that other sites will be discovered in these areas.

The presence of exploitable plant and animal resources at high elevations would have provided additional incentive for summer occupations in these areas. Alpine passes and meadows, terraces above streams and rivers, lakeshores, exposed grassy meadows, and exposures of bedrock or cobbles suitable for stone tool manufacture, are also considered to be areas of high historical resource potential.

At present, very little work has been done on the palaeontological resources of the region. These resources are widespread and varied and there is potential for fossil occurrences virtually anywhere that strata is exposed. Areas of high potential include exposures along streams and rivers as well as steep slopes and ridges above the tree line, and in excavations such as coal mines or major road construction or widening.

Historically, the region was the focus for early coal mining, ranching and forestry activity. The remains of structures relating to these activities may exist throughout the resource management area and would be of interest to Alberta Culture.

Resource Management Objective

1. The broad resource management objective applies within the resource management area.

Resource Management Guidelines

1. The Archaeological Survey of Alberta, Resource Management Section will participate in the land use referral process to review proposed developments in the following areas deemed to have historical resource potential:

   (a) Lands adjacent to the Oldman River and all its tributaries, Racehorse, Dutch and Vicary creeks and all their tributaries.

   (b) Potential archaeological and palaeontological sites at high elevations throughout the resource management area.

   (c) Potential archaeological and palaeontological sites on ridges and slopes above the tree line.

Timber

The timber resources in the West Livingstone resource management area are mainly in the mature to over-mature age-classes. Of the commercial species, pine is slightly more prevalent than spruce throughout the resource management area and the occurrence of balsam fir in the understory of spruce stands indicates the advent of climax forest conditions. Forest conditions in the West Livingstone resource management area are similar to those in the Livingstone-Upper Oldman resource management area.

The West Livingstone resource management area contains a large portion of the timber quota sphere of interest held by Atlas Lumber (Alberta) Ltd. There is a significant volume of timber to be harvested from this area over the next 15 to 20 years. Timber harvesting operations will be concentrated in the Racehorse and Dutch Creek drainages. Mature and over-mature timber in the North Racehorse Creek area will also be scheduled during the next 20 years.

The occurrence of the mountain pine beetle in the resource management area has been observed as sporadic occurrences as far as the Racehorse Creek forest recreation area.

The emphasis for forest management in this resource management area will include the maintenance of a sustained yield land base capable of satisfying both commercial and local demands for forest products. Treatments will continue as required to control the occurrence of mountain pine beetle populations and provide stable forest conditions.

Resource Management Objective

1. To maintain a sustained yield land base capable of satisfying commercial demands for forest products.

Resource Management Guidelines

1. Timber harvesting operations will be located in the Wintering Creek, Vicary Creek, Daisy/Pocket Creek, and the Racehorse/Dutch drainage areas. In cases where residual stands are to be harvested, cuts will be carefully designed to protect the snowpack to minimize impacts on water yields and provide wildlife habitat benefits.

2. Treatments will continue as required in an effort to control and minimize the occurrence of mountain pine beetle populations between the High Rock and Livingstone ranges.

Range

There is one grazing allotment within this resource management area; the Gap allotment. The permitted stocking rate in this resource management area is estimated at 2 184 AUMs. If range improvements are undertaken, these will be conducted to reduce brush encroachment. The emphasis for range management will be placed on maintaining the productivity on existing grasslands as well as better use of the secondary ranges. The use of cut blocks as temporary range to supplement existing rangelands will also be considered in this resource management area.

Resource Management Objective

1. To provide a forage base capable of supporting 2 184 AUMs.

Resource Management Guidelines

1. The existing forage base will be maintained by managing existing grasslands to their fullest potential. Range improvements will be limited to reducing brush encroachment.

2. The use of recently logged areas as temporary range will be considered on a site-specific basis to supplement existing range

resources. Grazing will be phased and controlled to ensure the establishment of coniferous regeneration. As cutblocks will be considered temporary range only, they will not be included in long-term calculations of carrying capacity.

Minerals

The West Livingstone resource management area is underlain by prospective coal seams associated with the Kootenay group of formations. These seams have been designated by the ERCB into two coal occurrences (Pocket Creek and Daisy Creek) and one coal deposit (Vicary Creek which is part of the larger Coleman coal field). The ERCB does not produce reserve statistics for occurrences, but assessments of eligible data collected for the Vicary Creek deposit indicate an established in-place resource of 131 megatonnes. Of these, 31 megatonnes are considered recoverable using existing underground mining technology (ERCB Report ST 87-31).

The Vicary Creek deposit was actively mined by Coleman Colleries Ltd. from 1957-79. Over this 22 year lifespan an estimated 7.6 million tonnes of coal was produced (ERCB Report 85-45). Three other mines have been recorded in the West Livingstone area but they were short lived and produced insignificant amounts of coal.

The West Livingstone resource management area has sustained relatively little petroleum and natural gas activity. Only eight wells have been drilled. Six of these were abandoned as dry holes and one is into production as part of the Coleman gas field (see Minerals summary - Crowsnest Watershed resource management area). The remaining well is currently suspended after testing gas at 169 x $10^6 m^3/dm$ in 1976. This is a significant gas test and could indicate the potential for the occurrence of another Savanna Creek or Coleman field. Interest in exploring for and developing additional reserves of gas continues as 20 per cent of the area is under lease.

A quartz mineral lease agreement has been issued for the North Racehorse Creek area, and an application for a metallic mineral exploration permit has been received for an area of the High Rock Range just north of Racehorse Pass. The metallic mineral potential of these areas is unknown.

Resource Management Objectives

1. To provide opportunities for renewed exploration and development of coal reserves particularly where major deposits have been identified.

2. To provide opportunities for industry to define the limits of and recover the reserves within the productive geologic structures of the Coleman gas field particularly since there is a

existing commitment to its development under A Policy for Resource Management of the Eastern Slopes, Revised 1984.

3. To provide opportunities for the orderly exploration and development of hydrocarbons throughout the West Livingstone resource management area.

4. To provide opportunities for the private sector to explore and develop quarriable and metallic mineral resources.

Resource Management Guidelines

1. In view of the significance of Critical Wildlife lands in the resource management area for elk winter range and migration routes, special operating restrictions (i.e. timing of exploration activities, access closures and reclamation standards or mitigation) will be necessary to minimize impacts on wildlife (Refer to Table 4 for a statement of management emphasis for Zone 2s in the resource management area).

2. Development of petroleum and natural gas, quarriable, metallic and aggregate minerals will be permitted in Critical Wildlife Zones where it can be demonstrated that there is no net loss in wildlife habitat, disruption of wildlife populations and loss of recreational values. Operating conditions will consider access restrictions, low duration and intensity of development and complete reclamation or mitigation.

3. Coal exploration will be permitted in Zone 2s in the West Livingstone resource management area. Any subsequent development of the coal resource will be determined through a preliminary disclosure and regulatory approvals. Potential wildlife management conflicts arising from coal exploration and development in Zone 2s must be mitigated as a condition of approval.

4. Development of sand and gravel will not be permitted in Zone 2 along the Oldman River because of the provincial significance of this trout fishery.

5. Localized geophysical activity and "step-out" drilling may be permitted in Zone 1s on a very limited scale and under stringent operating conditions where it is deemed justified in order to define the limits of, or recover the reserves within the Coleman gas play as well as from the isolated capped gas well in 8-33-10-4W5.

Access

Resource development in the West Livingstone resource management area has created a higher degree of access relative to other resource

management areas. The use of recreational off-highway vehicles is prevalent throughout the resource management area and is anticipated to occur with few limitations.

Resource Management Objective

1. The broad access management objectives apply.

Resource Management Guideline

1. Off-highway recreation vehicle uses including snowmobiles, all terrain vehicles, bikes and 4x4s will be permitted on an informal basis in this resource management area exclusive of Zone 1 and 2. The use of that portion east of the Atlas Road, south of the Dutch Creek Road and north of the Crowsnest Watershed resource management area will be encouraged with few limitations. The resource management area will be monitored to determine whether further constraints are indicated.

2. Vehicular access in the resource management area will be specified in an access management plan.

Implications of Resource Management Actions

Range

1. Domestic grazing levels will be maintained using existing rangelands. Provisions for range improvements have also been made to reduce brush encroachment.

Minerals

1. The rezoning of the western flank of the Livingstone Range in Twp. 9, Rge. 3, W5M from Critical Wildlife to Prime Protection means that the underground minable coal resources will now be sterilized over this 5 km^2 (2 mi^2) area. This area is currently designated Category 2 by the Coal Policy which already does not permit the development of the surface minable coal resources and places severe restrictions on coal exploration activities. It remains to be determined whether this additional prohibition of activities will render portions of the nearby Daisy Creek coal occurrence unrecoverable. Coal development on these lands have not occurred in the past but compensation claims on coal leases 6937, 6774 and 1378050024 may be anticipated. The rezoning also has the potential to affect development of the adjacent Coleman gas play. Since there is an existing provision under the Eastern Slopes Policy (which is endorsed by this plan) to continue its development, implications are correspondingly mitigated.

2. The rezoning of the Livingstone Range in Two. 10-11, Rge. 3, W5M from Critical Wildlife to Prime Protection has the implication of lost mineral exploration and development opportunity. This loss of opportunity however is offset by gained opportunity along the eastern shoulder of the High Rock Range where the Zone 1 was significantly diminished. No mineral dispositions are affected by the rezoning.

3. The creation of the Wintering Creek Zone 2 is offset by the deletion of the Daisy Creek Zone 2 in terms of the area on which more stringent operating conditions may be applied for oil, gas, quarriable and metallic mineral activities.

4.3 East Livingstone Resource Management Area C

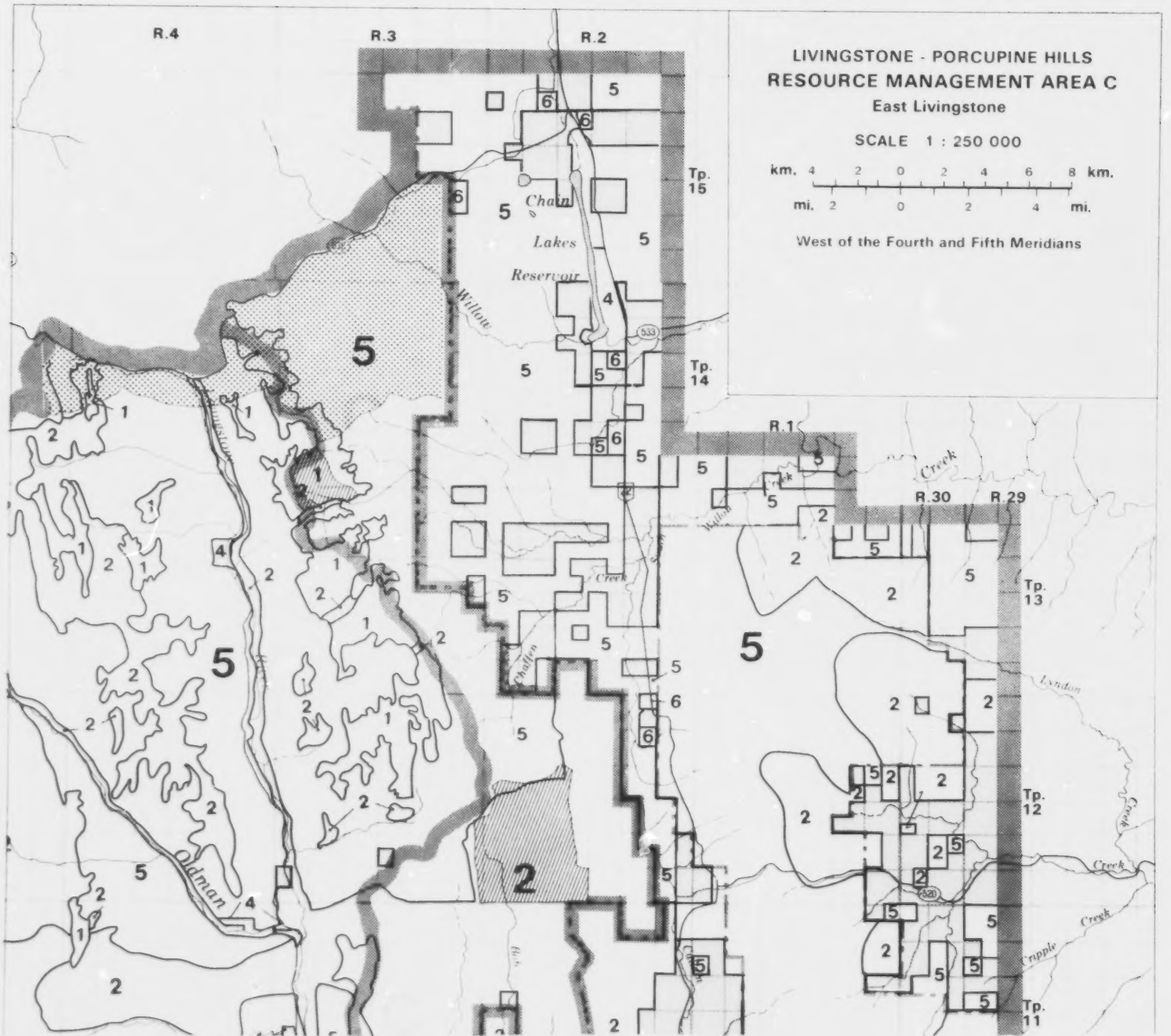
North of the Chaffen-Bob divide and west of the Bob-Hawkeye divide the primary intent is to provide a full range of multiple use activities managed to prevent adverse impact on watershed, fisheries and ecological resources (Figure 9). South of the Chaffen-Bob divide the primary intent is to protect critical wildlife habitat and ecological resources.

The Critical Wildlife Zone has been applied over the majority of the East Livingstone resource management area in light of the significance of elk and sheep habitats. The Bob Creek-Whaleback area supports approximately 50 per cent of the winter elk population found in the entire planning area. Critical winter ranges will be secured to maintain current population levels. Management emphasis will also be placed on shifting elk distribution away from private lands to the east. The eastern slopes of the Livingstone Range from Caudron Peak south provide winter and summer range for sheep.

The Critical Wildlife designation over the central portion of the resource management area will protect Class 1 trout streams.

The Upper Bob Creek ecologically significant area is located in the southern half of the resource management area. The emphasis placed on securing elk winter range will complement objectives for the perpetuation of ecological resources in this area.

The summit of the Livingstone Range forms the western boundary of the resource management area. Alpine and highly sensitive sub-alpine lands along this boundary have been zoned Prime Protection.


LIVINGSTONE - PORCUPINE HILLS
RESOURCE MANAGEMENT AREA C
East Livingstone
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West of the Fourth and Fifth Meridians
R.4
R.3
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Tp. 12
Tp. 11
Chain Lakes Reservoir
Willow Creek
Oldman
Crowsnest
London
Cripple Creek
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520

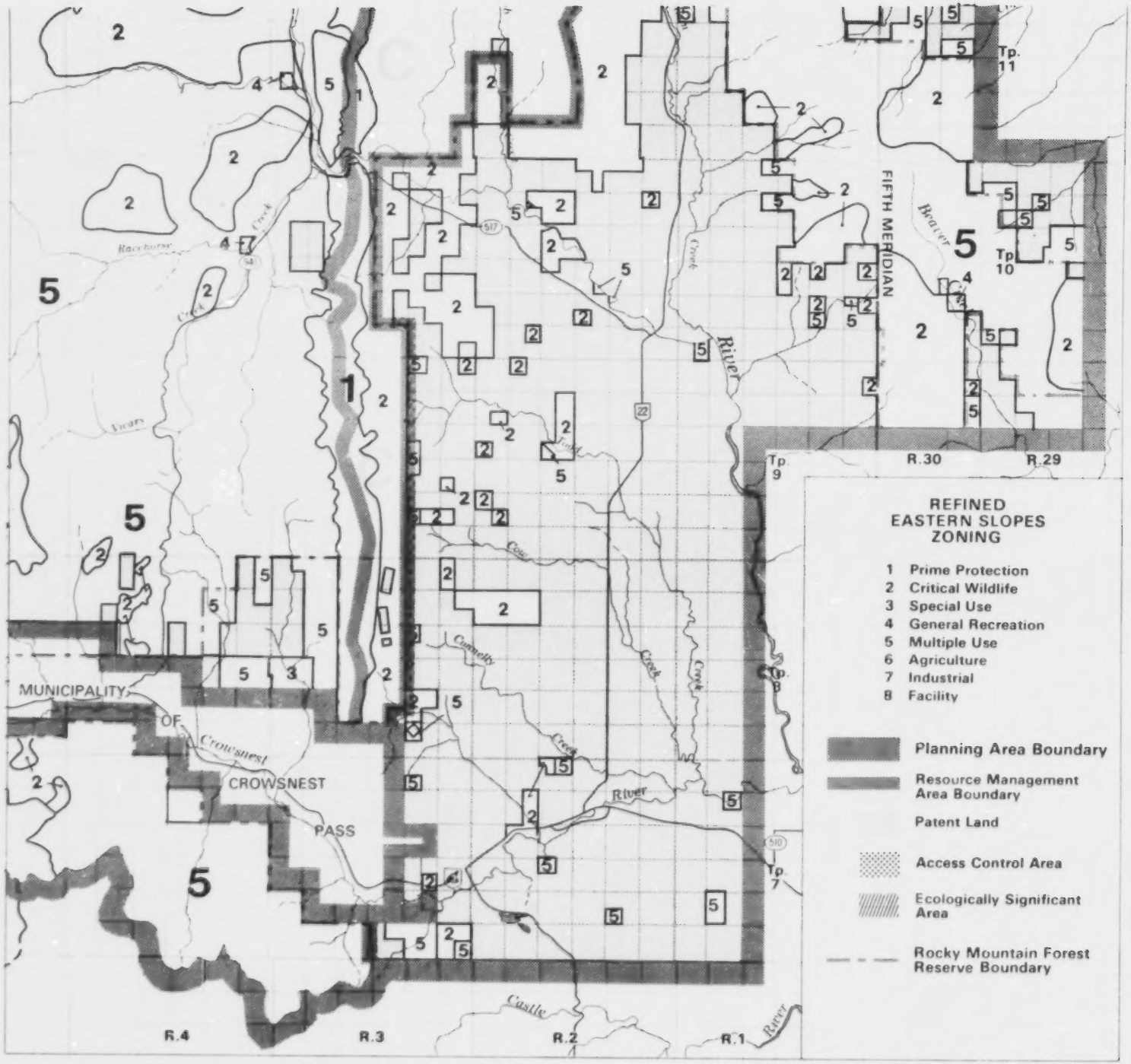


Figure 9 EAST LIVINGSTONE RESOURCE MANAGEMENT AREA

Multiple Use (Zone 5) is the predominant zoning designation in the northern half of the resource management area. A range of resource uses and activities will occur in this area. Management emphasis will be placed on the provision of an optimal allocation of available resources in this area on a site-specific basis. Watershed protection will continue to be a priority in this, as in other, Eastern Slopes zones. This is particularly important in that the area contains a valuable fisheries resource.

The Mt. Livingstone ecologically significant area falls within the northern half of the resource management area and is zoned Prime Protection.

The broad resource management objectives and guidelines stated in Section 2 apply to this resource management area. For brevity, they have not been repeated. Only resource management sectors with more detailed or specific objectives and guidelines are listed. The objectives provide a concise statement of a desirable condition or state for a resource or resource use. The guidelines describe a course of action to achieve these objectives. No priority is intended or implied by the sequence of objectives and guidelines.

Watershed

The East Livingstone area includes the east-facing slopes of the Livingstone Range. The terrain varies from rugged, mountainous slopes in the west to steeply rolling ridges in the upper foothills to the east. Locally weathered bedrock is the most common parent material along the Livingstone Range. Till deposits are found at lower elevations in the Foothills. These deposits vary in thickness, with bedrock exposures common along ridgetops. Changes in parent materials and the warmer, drier climate at lower elevations are reflected in a transition from poorly developed soils in the mountains to black soils on the foothill ridges.

The vegetation pattern reflects an environment that becomes much warmer and drier moving from west to east. Higher elevations along the Livingstone Range are characterized by lodgepole pine forests and grasslands. Sub-alpine spruce-fir forests are not extensive. At lower elevations in the foothills, aspen forests, Douglas fir forests and grasslands are the typical vegetation types.

Environmental sensitivity is generally high along the Livingstone Range because of steep slopes that are prone to mass wasting and erosion. Most of the foothills ridges are only moderately sensitive because slopes are less steep, but stream valleys have high sensitivity because of flooding hazards.

There is a reclamation project proposed for the Ernst/Todd Creek area involving a trail and an old mine exploration area associated with

Zones 1 and 2. The proposed Beaver Creek reclamation project, east of the Livingstone Ridge, extends into this resource management area toward Westrup Creek.

Resource Management Objective

1. The broad watershed management objectives apply.

Resource Management Guideline

1. The reclamation projects proposed for the Ernst/Todd Creek and Beaver Creek areas will be evaluated and undertaken subject to reclamation policies and funding according to availability and provincial priorities.

Wildlife

The East Livingstone resource management area contains most of the planning area's critical winter range for elk. The Bob's Creek-Whaleback portion of the area is particularly significant in that it supports about 50 per cent of the winter elk population in the planning area. The general resource management strategy is to secure and, if necessary, to enhance sufficient winter range for elk; to maintain current numbers; and to shift distribution away from private lands to the east where there are depredation problems.

Resource Management Objectives

1. To maintain current population levels of elk on traditional winter ranges (Bob Creek-Whaleback). To shift winter distribution of elk to current, historical or underused ranges on public lands.

2. To shift summer distribution of elk to western resource management areas.

3. To develop appropriate depredation management programs for private lands adjacent to this resource management area before any increases in elk populations occur.

4. To develop a land management strategy to maintain the quality, quantity and security of traditional elk winter ranges.

5. To operate the Bob Creek elk trap for relocation purposes.

6. To increase the number and distribution of sheep and moose utilizing the resource management area on a year-round basis.

7. To develop a land management strategy to maintain the quality, quantity and security of sheep winter ranges.

8. To promote forest and range management practices which will enhance moose habitat.

9. To maintain recreational hunting opportunity, commercial trapping opportunity and non-consumptive uses of wildlife.

10. To reduce the negative impacts of land use activities on wildlife and wildlife habitat.

11. To maintain current levels of abundance and distribution of other wildlife species by maintaining diverse habitat types.

12. To maintain a forage base capable of sustaining the following wildlife populations:

    Sheep - 57

    Elk - 565 in summer and 995 in winter

    Mule Deer - 950 in summer and 1 200 in winter

    White-Tailed Deer - 200 in summer and 250 in winter

    Moose - 325 in summer and 375 in winter

Resource Management Guidelines

1. The Fish and Wildlife Division will undertake an assessment of vegetative changes (succession, invasion) and land use practices on traditional inter-ranges; current and potential carrying capacities for wildlife will be assessed and plans will be reviewed with the Alberta Forest Service for timber removal, controlled burns, fertilization or access control to enhance the quality, quantity and security of winter ranges for elk and sheep.

2. The Fish and Wildlife Division will complete a review of chronic depredation areas, the magnitude of depredation problems, livestock/elk conflicts, current control measures, efficacy of current measures and will assess potential depredation control measures.

3. The Fish and Wildlife Division will participate in the development of an access management plan in conjunction with the Alberta Forest Service to provide security for elk winter range and sheep winter/summer ranges.

4. The Fish and Wildlife Division will continue to conduct regular surveys of priority species to assess management, development or protection requirements.

Fisheries

The East Livingstone resource management area contains part of the Oldman River, a Class 1 trout stream as well as the headwaters portions of Willow Creek, Rock Creek and Todd Creek and Camp Creek, an Oldman River tributary. Maintenance of high quality watershed values is required.

Resource Management Objectives

1. To maintain a high quality water supply of sufficient quantity for sport fish production.

2. To protect the integrity of aquatic and riparian habitats critical for continued sport fish production, primarily spawning, rearing and overwintering areas on the Oldman River, Crowsnest River tributaries, Camp Creek and Willow Creek and its tributaries.

3. To maintain current population levels and high productivity in sport fish populations.

4. To maintain current angler days of recreational fishing. To increase, where possible, recreational fishing opportunities.

5. To recognize and protect the provincial Class 1 stream status of the Oldman River.

Resource Management Guidelines

1. The Fish and Wildlife Division will increase recreational fishing opportunities, when demand warrants, by stocking suitable, barren waters with cutthroat trout. Improve current opportunities through selected stream habitat enhancement techniques.

2. The Fish and Wildlife Division, in conjunction with the Alberta Forest Service, will identify roads and stream crossings to eliminate water quality problems (siltation) through appropriate maintenance, reclamation or road closure. An assessment should be made of the impact of grazing on riparian habitats and water quality and, where necessary, a streambank fencing program will be undertaken in consultation with grazing disposition holders.

3. The Fish and Wildlife Division will continue to conduct regular surveys of streams to assess management requirements, angler use, habitat development potential and habitat protection needs.

Recreation

Random use sites known as Canyon Creek, Johnson Creek and Spring Creek are used, for picnicking and staging for equestrian activities.

This resource management area is undeveloped and recreational use is informal. The degree of recreational pressure in this resource management area is considered low. The area offers quality views and is known for its hunting and fishing potential.

The emphasis for recreational development will continue to promote the mostly undeveloped and informal recreational uses occurring in the resource management area.

Resource Management Objective

1. The broad objectives given for recreation apply in this resource management area.

Resource Management Guidelines

1. Areas identified as having potential for future recreation development, over the long term include a random use site at Spring Creek for remote camping and the Livingstone Lookout area for hiking trails.

2. The Alberta Forest Service will liaise with Alberta Transportation, Alberta Recreation and Parks and Alberta Tourism to determine the feasibility of, and financing and maintenance responsibilities for, a scenic viewpoint and rest stop at the summit of the Johnson Creek Road.

3. The location and establishment of a Commercial Trail Riding Area will be considered in the Chaffen/Riley Creek and Breeding Valley areas.

Tourism

The East Livingstone area has potential for a variety of high quality tourism products. The area is scenic and accessible by existing roads and trails. Secondary Road 517 crosses through the narrow area of the resource management area at the Oldman River. This area is presently used by river recreationists as access to the Oldman, and should be examined for a potential day use site. Both Whaleback Ridge and Livingstone Range are used by motorized and non-motorized recreationists. The implementation of an access management plan may allow for commercial trail riding in certain portions of the resource management area.

Resource Management Objectives

1. To encourage commercial adventure product operators (particularly trail riding operations) to increase use of this area.

2. To encourage extensive back-country recreation in this resource management area, particularly in the Whaleback Ridge area.

Resource Management Guidelines

1. Planning assistance will be provided to any private sector operator interested in providing tourist services or adventure products in this resource management area.

2. Planning assistance will be made available to any community group or tourist association interested in developing auto touring routes and brochures for this resource management area.

Ecological Resources

The upper Bob Creek ecologically significant area is approximately 25 km2 (10 sq. mi.) in areal extent. Biophysically, the area can be classified into three units:

Whaleback and Chimney Rocky Ridge. A ridge top complex containing extensive open stands of Douglas fir, pine and spruce and limited hillside grasslands on a primarily west facing ridge.

Bob Creek Valley. An association of mesic herb-rich fescue grasslands, willow shrublands, willow-dwarf birch wetlands and rich montane deciduous woodlands.

East-facing Ridge Complex. An association of diverse coniferous woodlands, lush montaine herblands and oatgrass-fescue grasslands.

The upper Bob Creek area has provincial significance because it represents a unique portion of the Rocky Mountain Montane Biogeographical Region. The area differs significantly from other protected montane areas in Alberta. Mesic communities are more pronounced, consequently species composition and diversity differs. The area contains several rare and uncommon plant species, many of which are restricted to southwestern Alberta.

The Mt. Livingstone ecologically significant area, including the summit and east slopes of Mt. Livingstone and a portion of the headwaters of Westrup Creek, has extremely high biophysical diversity, contains rare plant species and is very scenic. There is an 800 m (2 400 ft.) change in elevation and two deeply incised creeks, resulting in a variety of slope aspects and angles and a concurrent diversity of mesic

to xeric habitats. The area has forested slopes, fescue grasslands, sparsely vegetated "pavement" slopes and a variety of mesic plant communities and rare species. These qualities, together with the area's aesthetic value, merit protection.

Resource Management Objectives

1. To protect the ecological values of the upper Bob Creek area.

2. To protect the ecological values present in the Mt. Livingstone area.

Resource Management Guidelines

1. The existing reservation (protective notation) for the upper Bob Creek area will be retained until the status of the ecologically significant area is reviewed in relation to its candidacy as an ecological reserve.

2. Traditional use of the Bob Creek area will continue until such time as the candidacy of Bob Creek as an ecological reserve is complete. Domestic grazing and hunting in the interim will be generally permitted under normal operating conditions. The need for access control is recognized due to the history of conflict among resource users in this area. Traditional access through the upper Bob Creek area will be maintained, but trail use selectivity is needed to ensure the area's sensitive ecological values are not impaired by off-highway vehicle use (Refer to Access Section). The Alberta Forest Service will continue to consult with Alberta Recreation and Parks to ensure ecological values are maintained.

3. Mineral exploration and development will not be permitted in the Bob Creek ecologically significant area.

4. Low intensity recreation should be maintained in the Mt. Livingstone ecologically significant area.

5. The value of the Mt. Livingstone area from a regional and provincial perspective should be thoroughly analyzed to establish whether a special legislative designation such as a natural area is warranted. The area is found within Zone 1.

Historical Resources

Historical Resource inventories within the East Livingstone resource management area have been limited but have identified a number of prehistoric sites along major drainage systems in the area, particularly on the Oldman River in the vicinity of the Gap. The resource management area has high potential for the discovery of additional sites.

The slopes of the Livingstone Range were used by herds of big game animals, particularly in the fall, and it is expected that prehistoric sites associated with these herds will occur. There are a number of topographical features considered to have historic resource potential. These include terraces above permanent drainage systems, exposed grassy locations, the shorelines of lakes and exposures of stone suitable for prehistoric tool manufacture. This last occurrence may be of particular importance along the crest of the Livingstone Range within the resource management area as a major prehistoric quarry complex has been identified in a similar location just to the south of the planning area in the Municipality of Crowsnest Pass. Prehistoric occupation of the resource management area may be greater than 12 000 years ago.

At present, very little work has been done on the palaeontological resources of the region. However, these sources are widespread and varied and there is potential for fossil occurrences virtually anywhere that strata is exposed. Areas of high potential are considered to include exposures along streams and rivers as well as steep slopes and ridges above the tree line, and in excavations such as coal mines or along major roadways.

The region was the focus for early coal mining, ranching and forestry activity. The remains of several of these sites may exist throughout the resource management area.

Resource Management Objective

1. The broad resource management objectives applies within the resource management area.

Resource Management Guideline

1. The Archaeological Survey of Alberta, Resource Management Section will participate in the land use referral process to review any proposed developments involving land surface disturbance in the following areas:

   (a) Lands adjacent to Willow Creek and all its tributaries, Timber Creek, Westrup Creek and its tributaries, Owl Creek and its tributaries, Riley Creek and its tributaries, Beagle Creek and its tributaries, Hawkeye Creek and its tributaries, Bob Creek and its tributaries, Jacknife Coulee and its tributaries, Beaverdam Creek and its tributaries, the Oldman River and its tributaries, Todd Creek and its tributaries.

   (b) Palaeontological site - Section 21-13-3-5.

Timber

The timber resources in the East Livingstone resource management area are mostly in the immature age-class. A lesser degree of the over-mature age-class is also present. Of the commercial species pine is more prevalent than spruce and interior douglas fir that constitute the over-mature age-class component. There are no active timber licenses in the resource management area as the result of the abundance of the younger stands. The resource management area is a component of the Johnson Brothers Sawmills Ltd. timber quota sphere of interest and will become important in the future as that part of the forest reaches maturity. Timber harvesting in the area is anticipated in approximately 20 years.

The occurrence of the mountain pine beetle has been noted in moderate to high concentrations throughout the resource management area. Stand treatments have been initiated and will continue in an effort to reduce the impacts of the infestation.

Forest management in this resource management area will emphasize the maintenance of healthy and stable forest conditions to meet future demands for forest products.

Resource Management Objective

1. To maintain the forest resource and land base capable of satisfying future commercial demands for forest products.

Resource Management Guideline

1. Forest treatments will continue in an effort to control and minimize the impacts of the present mountain pine beetle infestation, or other pathogens, as required, throughout the resource management area.

Range

There are 10 complete grazing allotments within this resource management area; Timber Falls, Langford-Riley, Owl and Hunter, Chaffen Creek, Bob Creek, Upper Spring Creek, Lower Spring Creek, Outer Gap, Todd Creek and Rock-Connelly. The Willow Creek and Sheppard-Stimson allotments partially overlap into this resource management area, but have been addressed in the Kananaskis Country Integrated Resource Plan for simplicity.

The Chimney Rock and Waldron grazing allotments straddle the East Livingstone and Porcupine Hills resource management areas. For discussion purposes, Distribution Units 1, 2, 3 and 4 of the Chimney Rock allotment will be included in this resource management area. The Waldron

allotment and leases contained within this resource management area are also included.

The carrying capacities and permitted stocking rates in the East Livingstone area, including both leases and allotments, is estimated at 11 007 animal unit months. Of this, grazing leases managed by both the Alberta Forest Service and the Public Lands Division account for approximately 1 396 animal unit months. Included in the estimate are approximately 11 animal unit months, managed under allotment by the Public Lands Division.

The emphasis for range management will be placed on range improvements involving the clearing of deciduous species and the removal of noxious weeds on allotments. An estimated 627 hectares (1 550 acres) of range improvement has been identified and will be required to maintain the specified grazing level in this resource management area. Range improvement projects will be specifically addressed through revised range management plans.

Resource Management Objective

1. To provide a forage base that is capable of supporting an estimated 11 007 animal unit months.

Resource Management Guidelines

1. Range improvements will involve the clearing of deciduous species and the removal of noxious weeds where required. Over the long term, an estimated 627 hectares (1 550 acres) of range improvement will be required to maintain the range resource. The use of fire prescribed for range management purposes will also be considered in this resource management area. Revised range management plans and subsequent range development plans will be required when range improvements are necessary.

2. Range management plans and subsequent improvements will be co-ordinated through the referral process to include provisions for wildlife habitat.

Minerals

The East Livingstone resource management area contains known coal and portions of two coal leases, but no coal fields have been designated. The leases are in Category 1 of the Coal Policy where neither exploration nor development of the mineral has been permitted since 1976. Before 1976, three mine permits were granted. On one permit prospecting of the Belly River formation occurred from 1918-23. Prospecting occurred on the second permit area from 1922-26. From the third, only samples of surface

minable Kootenay formation coal were removed and tested in 1953. In all cases the exploration did not result in commercial quantities of production.

The East Livingstone resource management area has no identified oil or gas reserves. Five wells have been drilled in an attempt to find hydrocarbons but all were dry and abandoned. Despite the lack of success, nearly one-fifth of the area is under disposition and exploration activities continue.

The East Livingstone area contains portions of the Burmis Iron ore deposit which has periodically been the subject of exploration programs. The deposit's steep dip and discontinuity make it a marginal development prospect.

Resource Management Objective

1. To provide opportunities in all areas of the East Livingstone resource management area, exclusive of the Prime Protection zone, for the exploration of mineral resources in general and the development of reserves once they are established.

Resource Management Guidelines

1. The Whaleback Ridge-Bob Creek Critical Wildlife (Zone 2) lands provide the largest critical winter elk range in the planning area. Restrictions on timing and the extent of mineral exploration activities, access closures and special reclamation standards or mitigation will be necessary to minimize impacts on wildlife.

2. Development of mineral resources will be permitted in the Whaleback Ridge-Bob Creek Critical Wildlife Zone if it can be demonstrated that there is no net loss of wildlife habitat, disruption of wildlife populations and loss of ecological and extensive recreation values found within this area. Any development will be considered in a manner consistent with the protection of wildlife and landscape values.

3. Mineral exploration and development will not be permitted in the Bob Creek ecologically significant area.

4. Operating conditions for mineral exploration and development for the Livingstone Range Critical Wildlife Zone will consider access restrictions, low intensity and duration of development and complete reclamation or mitigation.

Access

The degree of land use pressures within the East Livingstone resource management area is considered low when compared with other resource management areas. Existing access accommodates range and forest management, forest protection measures, hunting and other recreational pursuits in the resource management area, particularly in the Bob Creek area. An access management plan is indicated to identify access and maintain the currently low land use pressures within the resource management area.

Resource Management Objective

1. The broad access management objectives apply.

Resource Management Guideline

1. An access management plan will be initiated for this resource management area where recreational off-highway vehicle use will be directed to selected trails and access routes. Off-highway vehicle use will be monitored to determine whether further mitigative measures are necessary.

2. In the interim, access will be directed to selected routes and trails in the upper Bob Creek ecologically significant area until the status of the area is determined and designated. Alberta Recreation and Parks will participate in the selection of preferred access routes in this ecologically significant area.

3. A Forest Land Use Zone, contiguous to that in the Dry Creek/North Twin/South Twin drainage (Livingstone-Upper Oldman resource management area), is proposed to control and direct motorized recreational access to designated routes and trails in the Johnson Creek/Timber Creek drainages.

Implications of Resource Management Actions

Ecological

The upper Bob Creek ecologically significant area, if designated as an ecological reserve, will be subject to the development of a management plan. The management plan will provide guidance for land use activities in accordance with the intent of the ecological reserve. The management plan will be developed utilizing public input.

Minerals

1. The rezoning of the Livingstone Range in Twp. 10-11, Rge. 3, W5M from Critical Wildlife to Prime Protection has the implication of lost oil, gas, quarriable and metallic mineral opportunity over 12 km^2 (5 mi^2) of land. There are no dispositions and no known potential for these minerals. Coal lease 7 034 and two quarter sections of freehold coal rights are affected.

2. The creation of the Zone 2 east of Caudron Peak and the deletion of the Zone 2s east of Wind Peak and Mt. Livingstone offset each other in terms of the area on which more stringent operating conditions for mineral activities may be applied.

4.4 Willow Creek-Lower Oldman Resource Management Area D

The primary intent of the Willow Creek-Lower Oldman resource management area (Figure 10) is to manage forage for domestic livestock and wildlife.

Public lands in the resource management area have been designated Multiple Use (Zone 5) and Critical Wildlife (Zone 2) with one exception. Chain Lakes Provincial Park has been designated General Recreation (Zone 4).

Public lands in the resource management area are all under grazing dispositions and a significant percentage provide critical winter range for elk, moose and deer. The maintenance of the forage resource for use by domestic livestock and wildlife is therefore essential.

All public lands in the resource management area have been assessed to determine suitability for more intensive agricultural use. Quarter sections found suitable for cultivation on the basis of agronomic information were subsequently reviewed to determine their value for other uses, including but not limited to wildlife habitat protection, sustained yield timber production, recreation capability and erosion control.

Arable lands with low environmental values have been designated Agriculture (Zone 6).

The broad resource management objectives and guidelines stated in Section 2 apply to this resource management area. For brevity, they have not been repeated. Only resource management sectors with more detailed or specific objectives and guidelines are listed. The objectives provide

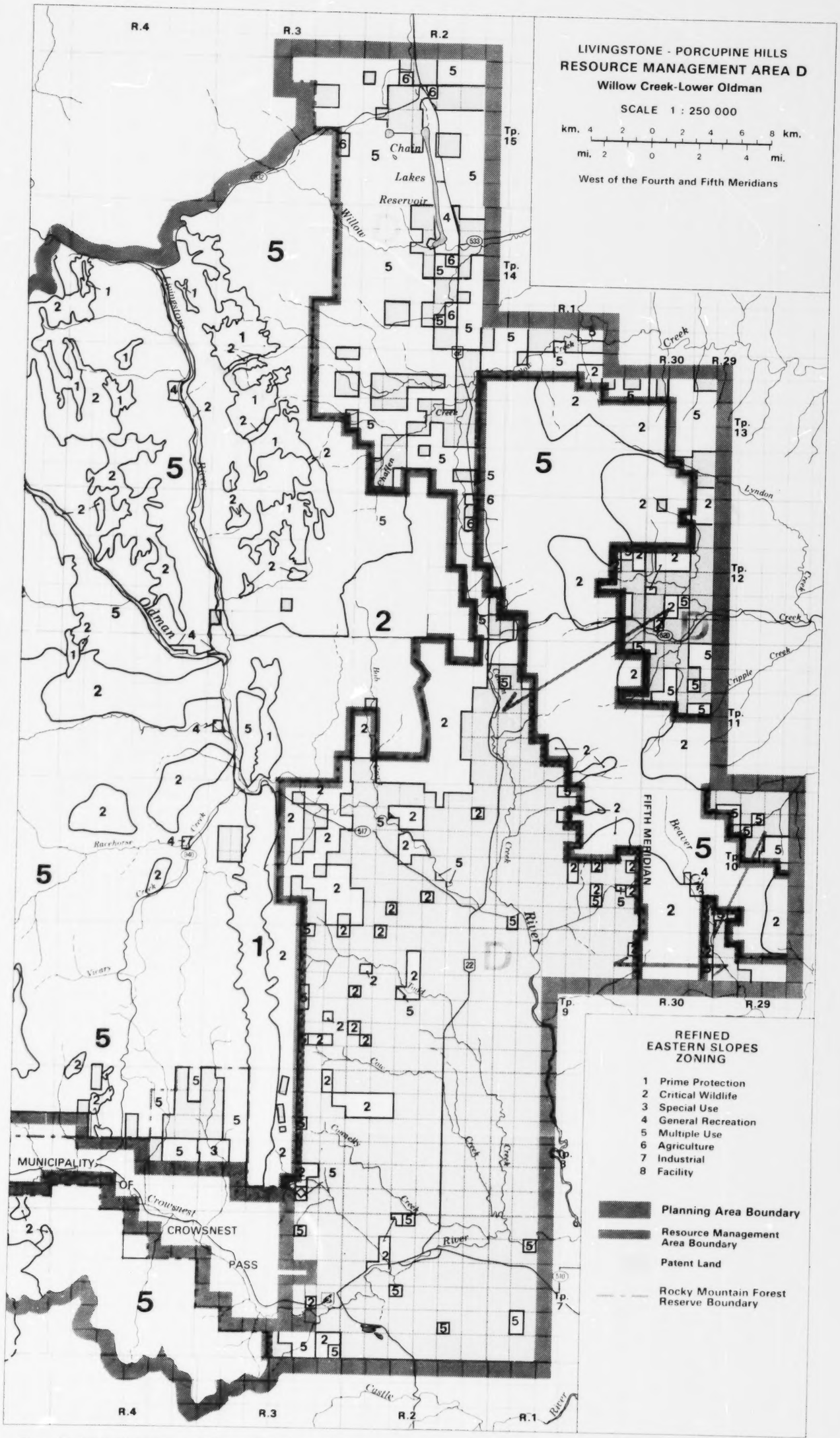


Figure 10 WILLOW CREEK - LOWER OLDMAN RESOURCE MANAGEMENT AREA

a concise statement of a desirable condition or state for a resource or resource use. The guidelines described a course of action to achieve these objectives.

Watershed

This area includes Chain Lakes and the lower portions of the Oldman River. The terrain consists of well defined foothill ridges with high relief and rolling slopes leading down from the Porcupine Hills. Relatively level lacustrine plains flank Chain Lakes and Willow Creek, and are also found along the lower reaches of the Oldman River. Till is the predominant parent material in Foothills terrain, with bedrock exposures less common than in the East Livingstone area. Fine-textured lake deposits are found on lacustrine plains.

The vegetation pattern reflects a transition from forest to grass land conditions. Aspen and Douglas fir forests are found on foothill ridges, with limber pine occurring at highest elevations on thin soils. A mixture of aspen stands and fescue grasslands are typical of lower elevations.

Environmental sensitivity based on erosion hazard varies from moderate to high on steeper ridges and low to moderate in the low-lying areas between ridges. The highest sensitivity occurs along tributary streams which are common in the area, because of the hazard of flooding.

The Willow Creek-Lower Oldman resource management area is not generally significant in terms of water production. Flow is highly variable with peaks occurring in May and June.

Resource Management Objectives

1. To maintain a high quality water supply for onstream and downstream users.

2. To minimize soil erosion and sedimentation from activities located near streambanks.

Resource Management Guideline

1. The location of resource use activities adjacent to streambanks will be regulated in accordance with normal operating conditions.

Wildlife

The Willow Creek-Lower Oldman resource management area contains a portion of the Whaleback Ridge, part of the large winter range for elk. Significant populations of moose and deer are also present in the resource management area. Wildlife resource goals are to stabilize elk

and deer population at current levels, to shift winter distribution to traditional ranges on public lands and to shift summer distribution to western resource management areas to reduce conflicts on patent lands. Potential exists to maintain and to increase moose populations through active habitat development and integration of range improvement programs.

Resource Management Objectives

1. To develop appropriate depredation management programs for private lands.

2. To maintain current population levels of elk on traditional winter ranges (Bob Creek-Whaleback).

3. To shift winter distribution of elk to historical or underused ranges on public lands.

4. To shift summer distribution of elk to western resource management areas.

5. To develop a land management strategy to maintain the quality, quantity and security of traditional elk winter range.

6. To maintain current population levels of deer in the resource management area.

7. To assess the requirements for enhancement of the quality and quantity of deer winter range on public lands.

8. To actively manage moose habitat to maintain and increase moose populations.

9. To maintain recreational hunting opportunity, commercial trapping opportunity and non-consumptive use of wildlife.

10. To reduce the negative impacts of land use activities on wildlife and wildlife habitat.

11. To maintain current levels of abundance and distribution of other wildlife species through the maintenance of a diversity of habitat types.

12. To maintain a forage base capable of sustaining the following wildlife populations:

    Elk - 200 in summer and 335 in winter

    Mule Deer - 1 050 in summer and 1 800 in winter

White-Tailed Deer - 400 in summer and 550 in winter

Moose - 350

Resource Management Guidelines

1. The Fish and Wildlife Division will complete a review of chronic depredation areas, the magnitude of depredation problems, livestock/elk conflicts, current control measures, efficacy of current measures and will assess potential depredation control measures.

2. The Fish and Wildlife Division, in conjunction with Public Lands Division, will support and assist in the planning and selection of public access routes on public lease lands and at the request of landowners, on private lands to reduce conflicts and facilitate better game management.

3. The Fish and Wildlife Division will continue to conduct periodic, regular surveys of priority species to assess management, development or protection requirements.

Fisheries

The Willow Creek-Lower Oldman resource management area contains: parts of the Oldman and Crowsnest rivers, provincial Class 1 status trout streams; several important tributaries of the Crowsnest River (Rock, Todd creeks); Willow Creek and several tributaries and Chain Lakes, and Burmis and Lees lakes, the only lakes in the planning area stocked with trout. Sport fishing of lakes and streams is major recreation only. Maintenance of high quality watershed values is important to protect the fisheries resource.

Resource Management Objectives

1. To maintain a high quality water supply of sufficient quantity for sport fish production.

2. To protect the integrity of aquatic and riparian habitats critical for continued sport fish production, primarily spawning, rearing and overwintering areas on the Oldman River, the Crowsnest River and its tributaries and Willow Creek and its tributaries.

3. To recognize and protect the provincial Class 1 stream status of the Crowsnest and Oldman rivers.

4. To maintain current population levels and high productivity in sport fish populations.

5. To maintain current angler days of recreational fishing.

6. To increase, where possible, recreational fishing opportunities.

7. To provide necessary public access to lakes and streams.

Resource Management Guidelines

1. Recreational fishing opportunities will be increased, when demand warrants, by stocking suitable barren waters. Maintain current stocking programs for Chain Lakes Reservoir, Burmis Lake and Lees Lake. Improve current opportunities through selected lake and stream habitat enhancement techniques.

2. The Fish and Wildlife Division, in conjunction with Public Lands, Alberta Transportation and local municipalities/improvement districts, should identify roads and stream crossings to eliminate water quality problems (siltation) through appropriate maintenance or reclamation.

3. The Fish and Wildlife Division will undertake an assessment of the impact of grazing on riparian habitat and water quality and, where necessary, fence streambanks in consultation with the Public Lands Division and grazing lease holders.

4. The Fish and Wildlife Division and Alberta Environment should monitor water quality in the Crowsnest River to ensure that nutrient enrichment from sewage, agricultural and natural sources does not adversely affect this stream's Class 1 status and trout fishery capability.

5. The Fish and Wildlife Division should, in conjunction with Public Lands and the Municipal District of Pincher Creek, develop an appropriate number of suitable public fishing access points on the Oldman and Crowsnest rivers.

6. The Fish and Wildlife Division will continue to conduct periodic regular surveys of streams and lakes to assess management requirements, angler use, habitat development potential and habitat protection needs.

Recreation

Chain Lakes Provincial Park provides overnight and day-use recreation opportunities oriented toward fishing. The park has 140 campsites, 25 day-use sites, boat launch and docking area, as well as associated maintenance and residence developments. Chain Lakes

Provincial Park is considered a special use park for fishing. Most intensive use occurs on weekends during the fishing season. It is also used as a winter sports area for snowmobiling and ice fishing.

Recreation Management Objectives

1. To develop Chain Lakes Provincial Park as a major staging area for non-mechanized summer recreation activities in the north Porcupine Hills and Chaffen/Horseshoe Ridge areas.

2. To provide high quality water-based recreation opportunities based on fishing in Chain Lakes Provincial Park.

3. To promote fisheries access along the Oldman River.

Resource Management Guideline

1. Extreme water-level fluctuations in the Chain Lakes reservoir will seriously affect the water-based recreation capability within the Chain Lakes Zone 4. The management of the reservoir's water regime must therefore take recreation values into account in association with downstream needs. A co-operative approach to water regime management should continue between Alberta Recreation and Parks, Fish and Wildlife Division, Alberta Forest Service and Alberta Environment.

Tourism

Highway 22 is becoming a popular scenic alternative to Highway 2 as it provides an excellent north-south travel route through this area. In the north, Highway 22 and Secondary Road 533 are the major entry points. There are no tourist facilities in the north now, with the exception of the facilities available at Chain Lakes Provincial Park at the intersection of Highway 22 and Secondary Road 533. The closest facilities are found outside the planning area in the Town of Nanton, 25 km to the north east. The Chain Lakes intersection could support limited private sector tourism facilities (e.g. gas station, grocery store, and rest rooms).

In the lower portion of the resource management area, Highway 22 is intersected by Secondary Road 517 at the Maycroft Bridge, and ends at Highway 3 in the Hamlet of Lundbreck. Highway 3 is the major route through the planning area, receiving 10 times the amount of traffic found on Highway 22. Maycroft Bridge is used as access for canoes and rafts on the Oldman River. If there is an increase in the amount of users at this site, consideration should be given to creating more suitable boat launching and parking areas.

Resource Management Objectives

1. To ensure public access to the Oldman River, Willow Creek, and South Willow Creek for water-based recreational activities as well as for scenic enjoyment.

2. To recognize Highway 22 as a major route and a focus for auto touring opportunities and to encourage the private sector to provide related services (e.g., gas station, grocery store).

3. To recognize Highway 3 as the major traffic route in the planning area and to encourage the private sector to increase the number of visitor services and facilities.

Resource Management Guidelines

1. Planning assistance from Alberta Tourism will be available to any commercial operator wishing to develop visitor services or facilities along Highway 22.

2. Planning and marketing assistance from Alberta Tourism will be made to any commercial operator wishing to develop, or expand, visitor services or facilities along Highway 3.

Historical Resources

Historical resource inventories have been conducted in several locations within the Willow Creek-Lower Oldman resource management area. Of these, the Crowsnest River east of Burmis has been studied the most extensively. An extremely dense concentration of prehistoric sites has been identified near the river and along Rock, Connelly and Cow Creeks. While inventories have been more sporadic elsewhere in the resource management area, these studies have identified additional site concentrations along the lower Oldman River and Willow, South Willow, Johnson and Rice Creeks. The entire Foothills zone including the slopes of the Porcupine Hills provided prime fall/winter habitat for bison herds throughout prehistory. The presence of prehistoric sites throughout the foothills confirms these herds were extensively hunted. This part of the resource management area therefore has the highest potential for prehistoric sites. Areas of highest potential include flat terraces above streams and rivers, lakeshores, margins of wetlands, elevated areas suitable for game observation and exposures of bedrock and cobbles suitable for stone tool manufacture. Prehistoric occupation may be greater than 12 000 years.

Very little palaeontological work has been done. These resources, however, are widespread and varied. There is potential for fossils virtually anywhere that strata is exposed. Areas of highest potential include exposures along streams and rivers as well as steep slopes and ridges, and in excavations such as coal mines or along major roadways.

The region was the focus of early coal mining, ranching and forestry activity. The remains of several of these sites may exist throughout the resource management area.

Resource Management Objectives

1. To protect historical resources (archaeological, historical and paleontological) found on public and patent lands from potential or actual impact.

2. To conserve historical resources for future generations.

Resource Management Guideline

1. The Archaeological Survey of Alberta will liaise with local authorities to review development proposals calling for major surface disturbance on deeded land. Resource developments proposed on public lands will be referred to the Archaeological Survey of Alberta through the interdepartmental land use referrals process. Patent and public land areas considered to have high historical resource potential include:

   (a) Lands adjacent to Willow Creek and all its tributaries, Chain Lakes Reservoir, South Willow Creek and all its tributaries, Callum Creek and its tributaries, Oldman River and its tributaries, Crowsnest River and all its tributaries, tributaries to Castle River, Beaver Creek and its tributaries, Muddy Pound Creek and its tributaries, Meadow Creek and its tributaries.

   (b) Land adjacent to Meinsinger Lake, Dirtywater Lake, unnamed lakes in Sections 20, 21, 28, 28-15-2-W5M, unnamed lake in Sections 14, and 23-15-2-W5M, unnamed lakes in Section 25-11-2-W5M, Section 23-11-2-W5M, unnamed lakes in Sections 29, and 30-9-2-W5M, unnamed lakes on tributaries to Todd Creek, Wildcat Creek, Cow Creek and Ross Creek, Ross Lake, unnamed lakes on the tributaries to Connelly Creek, Hudson Bay Lake, Lees Lake, and unnamed lakes on tributaries of the Crowsnest River.

   (c) Palaeontological sites in Section 24-13-2-W5M, Section 31-10-2-W5M, Section 16-7-2-W5M, Section 32-7-1-W5M, and Section 4-8-2-W5M.

   (d) Historic Sites in SW-4-7-2-W5M, SW-6-7-2-W5M, SW-24-7-3-W5M, SW-32-7-2-W5M, NW-34-7-2-W5M, NE-27-7-2-W5M, NW-31-7-1-5, SW-13-8-3-W5M, NE-14-8-3-W5M, NE-34-8-2-W5M, NE-35-8-2-W5M, SE-14-9-3-W5M, NE-14-9-2-W5M, SE-12-10-2-W5M, SE-16-10-2 -W5M, S1/2-18-10-2-W5M, NW-19-10-2-W5M.

Timber

Forest management in the Willow Creek-Lower Oldman resource management area includes the provision of forest products for local residents through the issuance of local or commercial timber permits. This is combined with the recognition of priority areas for agricultural development within which reforestation may not be undertaken. Over the long term an attempt will be made to manage softwood timber on a sustained yield basis where there is compatibility with agricultural uses.

The occurrence of mountain pine beetle populations in this resource management area has necessitated the control program. This has been and will continue to be undertaken on both public and patent lands with the co-operation of the Public Lands Division and private landowners.

Resource Management Objectives

1. To manage forested public lands in the resource management area considering local requirements for forest products and agricultural development.

2. To continue the mountain pine beetle control program as required in the resource management area.

Resource Management Guidelines

1. Forested public lands will be managed in accordance with the forest management policy in the White Area. Over the long term softwood timber will be managed on a sustained yield basis.

2. The Alberta Forest Service will continue to co-operate with the Public Lands Division and private landowners during the mountain pine beetle program.

Range and Agricultural Resources

Public lands in the White Area are stocked to carrying capacity given present level of management.

A total of 68 grazing leases and eight grazing permits covering 54 806 hectares (135 423 acres) of public land currently provide 60 726 AUMs of grazing. This rangeland resource provides an integral part of the mixed farming and ranchland economy.

The Alberta Forest Service manages a portion of a grazing lease in this resource management area. The Waldron lease, South Andrews field, accounts for an estimated 167 AUMs.

Resource Management Objectives

1. To maintain the 60 726 AUMs of domestic grazing.

2. To maintain the present public range resource through proper management for the benefit of domestic livestock, wildlife and watershed protection.

3. To allocate arable public lands in the resource management area to optimal uses.

4. To provide range improvements to increase productivity for the maintenance of current stocking capacities or increased capacities where reductions have occurred because of a decrease in the land base.

Resource Management Guidelines

1. Zone 6 (Agriculture) designation will be used to identify parcels suitable for cultivation. Changes to existing agricultural dispositions on these lands will only be considered through approved disposition processes.

2. All land use activities must be consistent with the primary intent for Zone 6 lands in the Willow Creek-Lower Oldman resource management area. Intensive recreation, serviced camping, commercial development, industrial development and residential subdivisions are among the inconsistent activities that will not be permitted in Zone 6.

3. Range management plans will be developed for all grazing units within the resource management area.

4. All government agencies with resource concerns will have an input, through the referral system, into range development plans undertaken on public lands.

5. Domestic livestock grazing will be managed as a compatible land use activity subject to normal operating conditions in Zone 2s throughout the Willow Creek-Lower Oldman resource management area.

6. Where domestic grazing and wildlife conflicts are identified by Public Lands Division and Fish and Wildlife Division, temporary reductions may occur in carrying capacities. A combination of reductions and more intensive range management practices should be followed to re-establish the carrying capacity of the rangeland.

Minerals

The Willow Creek-Lower Oldman resource management area contains the isolated Lundbreck coal deposit and the two coal occurrences named Cowley and Bob Creek. Reserve statistics are not produced for the occurrences, but assessments of eligible data collected for the Lundbreck deposit indicate an initial in-place resource of 6 megatonnes (ERCB Report ST 87-31). None of this resource is currently recoverable because the deposit is in Category 1 of the Coal Policy which has prohibited, since 1976, all coal exploration and development activities.

Although there are no mines active today, from 1889-1955, 26 mines were recorded. Most were either small or short-lived and their total accumulated production amounted to less than 500 000 tonnes of coal (ERCB Report 85-45). Only a few sections of Crown coal rights remain under lease today, but nearly half of the area is disposed as freehold mineral rights.

About 10 per cent of the Willow Creek-Lower Oldman resource management area is covered by petroleum and natural gas agreements. Exploration has been extensive with 27 wells drilled. Two are capped, having reached paying zones of natural gas. These gas discoveries are both small and isolated and have therefore not warranted the establishment of a field. In terms of infrastructure, there are three major pipelines that traverse the resource management area. Two carry oil south to the United States and one carries gas west into British Columbia.

The only quarriable or metallic mineral of interest is the iron ore deposit that outcrops sporadically for about five miles along a ridge that runs due north from the hamlet of Burmis.

Resource Management Objectives

1. To provide opportunities for the renewed exploration and development of coal resources.

2. To provide continued opportunities for the exploration and development of hydrocarbons.

3. To provide opportunities for the exploration of quarriable and metallic mineral resources and the development of any such reserves once they are established.

Resource Management Guidelines

1. Extraction of sand and gravel for industrial or commercial purposes and the exploration and development of all minerals in general will not be permitted in the Chain Lakes Zone 4.

2. The Whaleback Ridge-Bob Creek Critical Wildlife (Zone 2) lands provide the largest critical winter elk range in the planning area. Restrictions on timing and the extent of mineral exploration activities, access closures and special reclamation standards or mitigation will be necessary to minimize impacts on wildlife.

3. Development of mineral resources will be permitted in the Whaleback Ridge Critical Wildlife Zone where it can be demonstrated that there is no net loss of wildlife habitat, disruption of wildlife populations and loss of ecological and extensive recreation values found within this area. Any development will be considered in a manner consistent with the protection of wildlife and landscape values.

Access

Recreational off-highway vehicle use occurs on public and private lands throughout the Willow Creek-Lower Oldman resource management area. Use of off-highway vehicles on these lands is particularly high during hunting season.

In recent years, use of recreational off-highway vehicles has increased significantly on public lands used for domestic grazing in the Johnson Creek Road-Chain Lakes area. The departure of off-highway vehicles from established trails and road allowances has created range and terrain damage.

The Alberta government continues to promote a co-operative approach to the resolution of this problem. The government encourages the disposition holder and the general public to co-operate in the use of these lands where outdoor recreation activities are involved. The "Use Respect" program continues to be an effective measure to elicit co-operation. Further measures may however be required in high use areas within the resource management area.

Public lands in this resource management area also provide access points for water-based recreation. Rafting and canoeing are popular activities.

Resource Management Objectives

1. To manage recreational off-highway vehicle use on public lands to minimize range and terrain damage.

2. To ensure public access to the Oldman River, Willow and South Willow creeks for water-based recreation activities as well as for scenic enjoyment.

Resource Management Guidelines

1. The Public Lands Division will work in conjunction with interested government resource management agencies, local authorities, public interest groups and the general public to develop an access management plan for public lands north of the Oldman River. This plan will be coordinated with the access management plans for Resource Management Areas A, B, C, E, F and G to be prepared by the Alberta Forest Service to ensure continuity.

2. Access sites for water-based recreation on the Oldman River, Willow and South Willow creeks will be addressed in the access management plan.

Implications of Resource Management Actions.

Timber

1. Opportunities for forest management will be possible. Reforestation will occur in areas where agricultural development is not a priority on a site-specific basis.

Minerals

1. The diminished size of the Chain Lakes Zone 4 will mean additional areas will be available for mineral exploration and development activities.

4.5 North Porcupine Hills Resource Management Area E

The primary intent of the North Porcupine Hills resource management area (Figure 11) is to provide for range, recreation, and timber uses. Management activities related to oil and gas will strive to be compatible with this primary intent. All uses will be managed to prevent adverse environmental impacts on watershed, wildlife, and ecological resources.

This resource management area consists of timber stands and natural openings, generally on slopes less than 45 per cent within existing livestock allotments. Forage is provided by natural meadows and transitory range. The areas are also suited for dispersed and lightly developed recreation. In addition, there is potential for further discoveries of natural gas. This range of values has merited the application of the Multiple Use Zone over most of the resource management area. The Critical Wildlife designation also covers a substantial part of the area in light of the importance of selected areas as critical winter range for elk.

The broad resource management objectives and guidelines stated in Section 2 apply to this resource management area. For brevity, they have not been repeated. Only resource management sectors with more detailed or specific objectives and guidelines are listed. The objectives provide a concise statement of a desirable condition or state for a resource or resource use. The guidelines describe a course of action to achieve these objectives. No priority is intended or implied by the sequence of the objectives and guidelines.

Watershed

The North Porcupine Hills are formed from resistant sandstone shale overlain by medium-textured till. Till deposits are thin along ridgetops where weathered bedrock forms the parent material. The only other significant deposits are fluvial gravel laid down along stream channels.

The vegetation is highly varied and local composition depends on elevation, slope and exposure. Douglas fir and lodgepole pine are found along ridgetops, extending to lowest elevation along north-facing slopes. A mixture of lodgepole pine, white spruce and Douglas fir forests are found on upper slopes, while lower slopes support a mixture of aspen forest, Douglas fir forest and fescue grassland.

Environmental sensitivity in this area depends mainly on slope. Average slopes in the range of 15-30 per cent have a moderate sensitivity to erosion, while the erosion hazard is low on gentler slopes. The highest sensitivity is found on short steep slopes that can reach 60 per cent and along stream channels where flooding is a hazard.

Resource Management Objective

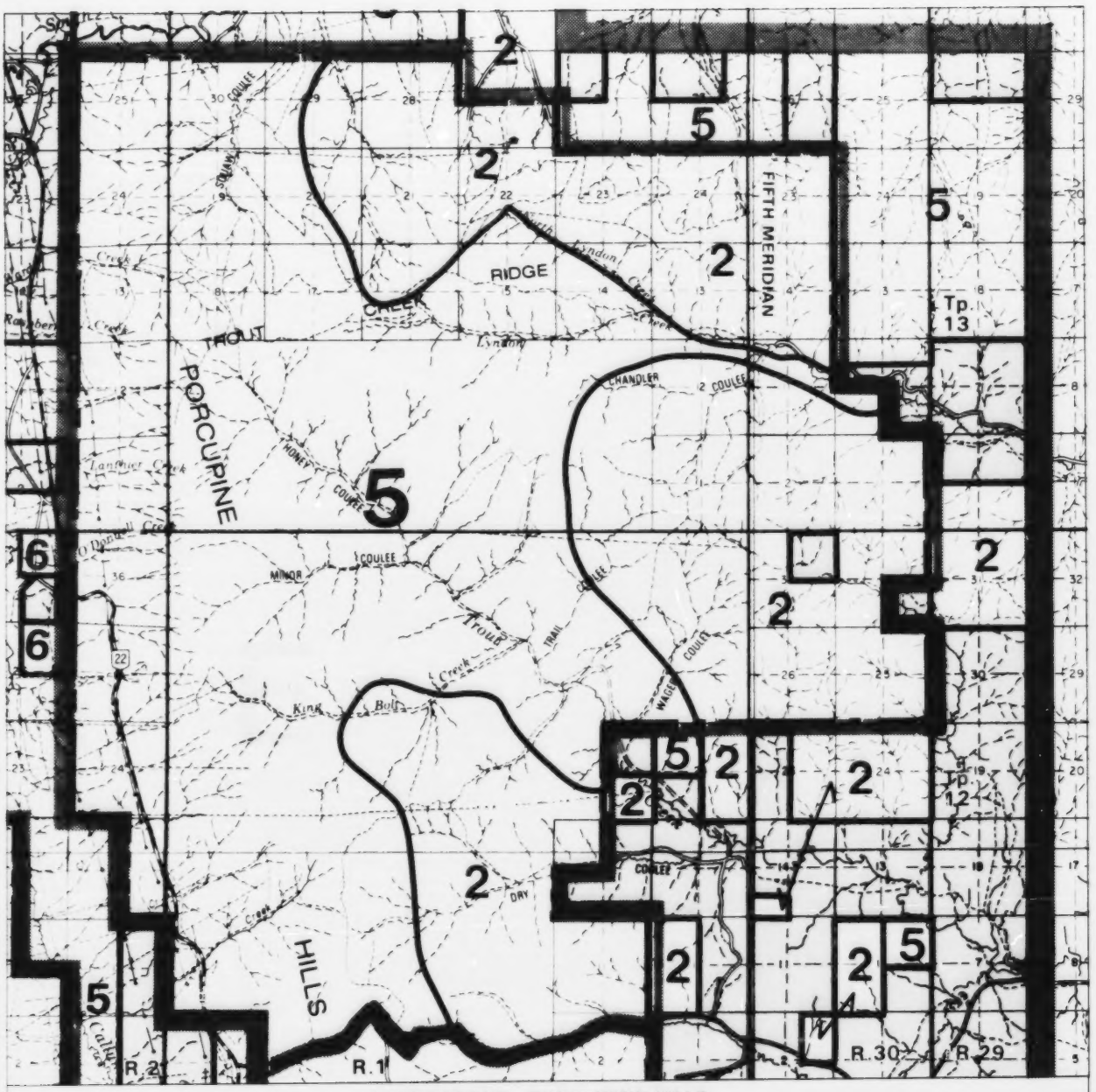
1. To maintain a reliable, high quality water supply for onstream and downstream users.

Resource Management Guideline

1. The Alberta Forest Service, Fish and Wildlife Division, Alberta Environment, and Alberta Recreation and Parks will examine the feasibility of small water impoundments in the North Porcupine Hills to sustain a recreational fishery, provide a ready water source for forest fire suppression, domestic grazing and to augment downstream water use.

Wildlife

The North Porcupine Hills resource management area supports a high level of recreational hunting opportunity for elk, deer, moose and



LIVINGSTONE - PORCUPINE HILLS

SCALE 1 : 100 000

RESOURCE MANAGEMENT AREA E

North Porcupine Hills

REFINED EASTERN SLOPES ZONING

Patent Land

Rocky Mountain Forest Reserve
Green Area Boundary

1 Prime Protection
2 Critical Wildlife
3 Special Use
4 General Recreation
5 Multiple Use
6 Agriculture
7 Industrial
8 Facility

Planning Area Boundary

Resource Management
Area Boundary

Figure 11 NORTH PORCUPINE HILLS RESOURCE MANAGEMENT AREA

cougar. The resource management area supports a high population of deer, both summer and winter, and supports a large population of cougar, a resident elk herd. and high densities of moose.

Resource Management Objectives

1. To maintain current population levels of elk and deer in the resource management area.

2. To shift elk and deer summer/winter distribution to historical or underused ranges within the Rocky Mountain Forest Reserve.

3. To develop appropriate depredation management programs for private lands adjacent to the resource management area.

4. To develop a land management strategy to maintain the quality, quantity and security of ungulate winter ranges.
5. To actively manage moose habitat to maintain and increase moose populations.

6. To maintain recreational hunting opportunity, commercial trapping opportunity and non-consumptive uses of wildlife.

7. To reduce the negative impacts of land use activities on wildlife and wildlife habitat.

8. To maintain current levels of abundance and distribution of other wildlife species through maintaining diverse habitat types.

9. To assess population levels and key habitat requirements for cougars.

10. To maintain a forage base capable of sustaining the following wildlife populations:

    Elk - 325

    Mule Deer - 800

    White-Tailed Deer - 150

    Moose - 300

Resource Management Guidelines

1. The Fish and Wildlife Division will undertake an assessment of vegetative changes (succession, invasion) and land use practices on traditional winter ranges; current and potential carrying capacities for wildlife will be assessed and plans will be reviewed

with the Alberta Forest Service for timber removal, integration with timber harvest, controlled burns, fertilization or access control to enhance the quality, quantity and security of winter ranges for elk and deer, and year-round habitat for moose.

2. The Fish and Wildlife Division will complete a review of chronic depredation areas, the magnitude of depredation problems, livestock/elk conflicts, current control measures, efficiency of current measures and will assess potential depredation control measures that might be undertaken on public lands within the resource management area.

3. The Fish and Wildlife Division will participate in the development of an access management plan, in conjunction with the Alberta Forest Service, to provide security for elk/deer winter range and to provide opportunities within the resource management area for recreational hunting of the non-motorized type. (See "Access" Section).

4. The Fish and Wildlife Division will continue to conduct periodic, regular surveys of priority species to assess management, development or protection requirements.

Fisheries

Streams in the North Porcupine Hills resource management area have a severe limiting factor to sport fish production, namely the lack of a reliable flow of water. Lyndon Creek and beaver ponds on other streams provide some recreational fishing. Maintenance of high water quality is required to ensure downstream sport fisheries are not jeopardized.

Resource Management Objectives

1. To maintain a high quality water supply of sufficient quality for sport fish production.

2. To protect the integrity of aquatic and riparian habitats critical for continued sport fish production.

3. To maintain current population levels and high productivity in sport fish.

4. To maintain current angler days of recreational fishing. To increase, where possible, recreational fishing opportunities.

Resource Management Guidelines

1. Recreational fishing opportunities should be increased, when demand warrants, by stocking suitable barren waters. Maintain current stocking programs for suitable beaver ponds and assess other locations suitable for stocking. Improve current opportunities through selected stream habitat enhancement techniques.

2. The Fish and Wildlife Division, in conjunction with the Alberta Forest Service, will identify roads and stream crossings that cause water quality problems (siltation). Problems will be eliminated through appropriate maintenance, reclamation or road closure. An assessment should be made of the impact of grazing riparian habitats and water quality and, where necessary, fence streambanks in consultation with grazing disposition holders.

3. The Fish and Wildlife Division will continue to conduct regular surveys of streams and ponds to assess management requirements, angler use, habitat development potential and habitat protection needs.

Recreation

The North Porcupine Hills are characterized by a complex intermix of montane, aspen parkland and fescue grassland ecoregions, producing a diverse natural landscape with a variety of flora, fauna and soils. The vegetation pattern is unlike that of any other area in the province. The topographic variation, combined with the vegetation diversity, produces an exceptionally beautiful landscape capable of supporting a variety of high-quality, extensive recreation opportunities. The North Porcupine Hills have good potential for providing walking, interpretive and nature study opportunities. Recreation potential in the area is primarily concentrated in the upper Trout Creek basin and its surrounding ridges. Ridge crests providing vistas west to the mountains or down into scenic coulees and areas of open park-like stands of Douglas Fir or spruce are particularly attractive.

Present recreation use in the North Porcupine Hills resource management area is informal, dispersed and, with the exception of the hunting season, moderate to low in intensity. There are no formal recreation facility developments in the north Porcupine Hills. The area is used for a variety of recreation activities including scenic drives, primitive camping, hiking, hunting, horseback riding and off-highway vehicle driving. Other land uses occur concurrently with recreation, including domestic livestock grazing, petroleum and natural gas development and timber management.

The two provincial parks in the immediate area, Chain Lakes and Willow Creek, have created a demand for a substantial amount of day-use

hiking, walking and interpretive opportunities which is not presently being satisfied because of the limited land base and resources of the parks. Tourist traffic on Highway 22 also creates a demand for viewpoints, stopovers, short interpretive trails, signs and similar services. Over the next few years, plans to improve the existing park facilities, promote increased tourist awareness of the beauty of this region, and improvements to Highway 22 and Secondary Road 520 will significantly increase the demand for these activities.

Resource Management Objectives

1. To support existing recreational uses, including maintaining hunting opportunities and encouraging other recreational uses of wildlife.

2. To provide dispersed recreation opportunities that will complement intensive recreational developments in the area, particularly those at Chain Lakes and Willow Creek Provincial Parks.

3. To provide opportunities that will encourage the development and promotion of auto-touring routes and tourism activities along Highway 22 and Secondary Road 520.

4. To maintain vegetation diversity in selected areas representative of the Foothills parkland, fescue grasslands and mountain landscapes and support opportunities to interpret these natural landscapes to the public.

Resource Management Guidelines

1. Resource agencies will recognize the aesthetic and recreational values of the North Porcupine Hills in the planning of activities, and will accordingly implement resource management practices to ensure the maintenance of this resource management area's scenic resources and character.

2. A variety of trail- and nature-oriented activities occur and may be supported by the provision of staging areas, picnic sites, viewpoints, and equestrian, interpretive, short walking and hiking trails.

3. Low levels of back-country camping occur and may be supported by the provision of a small number of designated back-country campsites in appropriate locations.

4. Trails will generally be located to maximize exposure to the aesthetic and educational features of the area, particularly the Douglas fir savannah, mature spruce stands, view points and other features of special interest.

5. Non-motorized recreational use will be emphasized in this area. (Refer to "Access" Section).

Tourism

Owing to its unique variety of vegetation and exceptional scenic qualities, the North Porcupine Hills resource management area has excellent potential for extensive recreation and auto touring.

At the present time dispersed extensive recreation, including hunting, fishing, hiking and random camping, as well as incidental auto touring on Burke Creek road and Hwy 22, are the main visitor activities. Off-highway vehicle use is increasing substantially in the planning area, most of which is associated with either hunting or fishing. In order to maintain the recreation priority established for this resource management area, there must be adequate staging areas on the periphery for visitor use. Scenic pull-off areas for the Burke Creek road and Highway 22 will be necessary to promote this area as a scenic touring route.

There is also potential for new staging areas for adventure products such as trail riding. When established, these staging areas would provide better access for new or existing adventure product operators and the general public.

Resource Management Objective

1. To assist Alberta Forest Service, Alberta Recreation and Parks and Alberta Transportation to determine the most appropriate locations for visitor facilities such as staging areas, trails, pull-off areas and scenic viewpoints on Hwy 22 and the Burke Creek Road.

Resource Management Guidelines

1. Alberta Tourism will provide input into any plans for recreation facilities upon request from the Alberta Forest Service. This input will be based upon knowledge of tourist trends and existing markets for the Livingstone Porcupine Hills planning area.

2. Consultative assistance will be provided by the Co-ordinator of Adventure Vacations in Alberta Tourism for any private sector individual interested in starting or expanding tourist operations in the resource management area.

Historical Resources

Only a few historical resource inventories have been conducted in the North Porcupine Hills resource management area. A number of prehistoric sites have been identified along small drainage systems in

the western edge of the area. However, the unexamined eastern portion of the resource management area exhibits even greater potential. Very high potential for sites of major significance exists because of the unique geological and topographical nature of the area. Quaternary geologists contend this area escaped glaciation during all except the earliest portion of the Pleistocene. Alley (1973) suggests ridges above 1 700m (5 577 ft.) were never affected by glacial ice. These ridges correspond closely with Ecological and Classification ecotype 5X1 and are characterized by gentle to steep slopes (5-30 per cent) with Douglas fir and Douglas fir-lodgepole pine as most common cover types (Alberta 1979). If, as is widely believed, North America was originally populated by groups migrating south from Beringia along the Eastern Slopes of the Rocky Mountains, then sites dating to much earlier than 12 000 years could be located in this area in an undisturbed context. The oldest known site in Canada which dates to 15 000 years is located in the Yukon. Sites of a similar age or older may be discovered in the Porcupine Hills. Such an occurrence would be of major significance.

The resource management area is characterized by broad well drained grassy coulees which would have provided excellent grazing especially in late summer and fall when the plains were very dry. Because of this sites of great antiquity as well as more recent sites may occur in areas such as terraces above streams and rivers, elevated areas suitable for game observation and exposures of bedrock or cobbles suitable for stone tool manufacture. Similarly, rock shelters or caves have high potential for the discovery of very early sites. Additionally, the lack of glacial activity in the area may have resulted in extremely deep burial of early sites, consequently, dry coulees and other types of sediment traps may contain evidence of early occupations.

Very little work has been done on the palaeontological resources of the area. These resources are widespread and varied and there is potential for fossils virtually anywhere that strata is exposed. Areas of high potential are considered to include exposures along streams and rivers, steep slopes and major roadways.

The region was the focus for early coal mining, ranching and forestry activity. The remains of several of these sites may exist throughout the resource management area.

Resource Management Objective

1. The broad historical resource objective applies within the resource management area.

Resource Management Guideline

1. The Archaeological Survey of Alberta, Resource Management Section will participate in the land use referral process to review any proposed developments involving land surface disturbance on lands:

   (a) within Ecological Land Classification ecotype 5X1 in the Porcupine Hills because of the extremely high potential for archaeological sites of provincial, national or international significance; and

   (b) adjacent to Lyndon and North Lyndon Creeks and their tributaries; all tributaries of South Willow Creek; tributaries of Chaffen Creek; and Burke Creek and its tributaries.

Timber

The timber resource of the North Porcupine Hills resource management area is characterized by an age class distribution which favors the immature and over-mature age classes. Of the commercial species, pine is more prevalent than spruce and interior Douglas fir. It is the spruce and Douglas fir, however, that constitute the majority of the over-mature age class.

The resource management area contains timber quota spheres of interest held by Johnson Brothers Sawmills Ltd. and M. Sosnowski. Only one of these quotas is active with 100 per cent of its wood requirements to be derived from within the resource management area over the next 20 year period. The other quota commitment in this area is not scheduled to begin operations for another 10 to 15 years.

In addition to the quota commitments in this resource management area, there is a need to formalize a local use wood supply area in the North Porcupines. Local use timber demands have been averaging close to 1 200 m3 annually. The timber to meet this demand has been provided from as far away as Blairmore and Willow Creek. The ranching community in the vicinity of Claresholm, Nanton and Stavely requires a closer supply. The Lyndon Creek area within the North Porcupines has been established as a Miscellaneous Timber Use Area to meet this demand.

The occurrence of the mountain pine beetle has been heavy throughout the resource management area. Stand treatments have been initiated and have reduced the impact of the infestation.

Resource Management Objectives

1. To manage the forest on a sustained yield basis while satisfying both commercial and local demands for forest products.

2. To provide for healthy stands of timber and optimize timber growing potential.

3. To manage forest cover types to comply with visual quality requirements for recreation use.

Resource Management Guidelines

1. Timber operations will primarily utilize the clearcut block method of timber harvesting. All operations will be planned according to landscape logging techniques and to provide wildlife habitat benefits.

2. The Lyndon Creek Miscellaneous Timber Use Area will be managed to supply local residents with a sustained supply of timber at a rate of 1 200 m^3 annually.

3. The balance of the resource management area will provide existing quota commitments with timber according to the provisions of the timber management plan for the C5 F/M Unit.

4. Treatments will continue in an effort to control the mountain pine beetle throughout the resource management area.

5. Visual management guidelines will be developed by the Alberta Forest Service and Alberta Recreation and Parks.

Range

Grazing of domestic livestock is a long standing land use in the North Porcupine Hills. The high capability for grass production is the main reason for the historical and present significance of domestic grazing in the Porcupine Hills.

Within the North Porcupine Hills resource management area, there are six complete range allotments: McLeod, West Trout, Streeter, Lewis, Conrad and East Trout. Burke Creek and Chimney Rock are two allotments partially contained in the resource management area. The Waldron grazing lease is also partially contained in this resource management area. The permitted stocking rate (1977 Preference Quotas) on range allotments in the resource management area is estimated at 7 497 animal unit months. The Waldron grazing lease provides approximately 328 AUMs in this area. The North Porcupine Hills resource management area, therefore provides a total of 7 825 animal unit months for domestic grazing purposes.

Reductions in primary rangelands from brush encroachment and aspen invasion has reduced total forage production which could result in overuse. In order to continue to maintain domestic livestock use at 1977 preference quota levels and reduce impacts of wildlife, range improve

ments are required. This action will help increase the range productivity and restore its condition.

The North Porcupine Hills resource management area has potential for range improvement. Approximately 1 133 hectares (2 800 acres) have been identified in this area. This represents a minimum of 50 per cent of the available improvement potential east of the Livingstone Range.

Resource Management Objectives

1. To maintain rangelands in good condition through appropriate livestock management and the use of range improvement practices, where required.

2. To maintain, as a base level, 7 825 animal unit months for domestic grazing.

3. To provide for additional forage production where feasible through range improvement practices and livestock management.

4. To promote the use of alternate, temporary forage sources (i.e. cut-blocks) to supplement the use of existing range land.

5. To provide for the allocation of forage for both domestic livestock and wildlife.

Resource Management Guidelines

1. Range improvement programs will be coordinated with other resource uses.

2. Vegetative manipulation (e.g. reduction of brush encroachment) will be used to maintain and enhance forage production. This area contains approximately 1 133 hectares (2 800 acres) of land having range improvement potential.

3. The use of cutblocks as temporary rangelands will be considered on a site specific basis to supplement existing range resources.

4. Grazing on cutblocks will be phased and controlled to ensure the successful establishment of coniferous regeneration.

5. Domestic livestock will only be allowed to utilize 50 per cent of the normally available forage to ensure sufficient forage is available for wildlife.

6. New structural improvements such as watering areas should be located where necessary and should be consistent with visual quality objectives where practical.

Minerals

Approximately 35 per cent of the North Porcupine Hills resource management area is disposed in petroleum and natural gas agreements. Exploration has been limited with only two wells drilled. The Trout Creek well was the only one to reach zones of paying gas. It has been capped since 1982 as there is no pipeline with which to tie into a production network. This relatively recent gas find should encourage industry to continue with seismic and exploratory drilling operations in the Porcupine Hills area.

Coal, quarriable and metallic minerals are of low interest in this resource management area. Recoverable deposits have not been identified although some coal was mined from this area around the turn of the century. There is no present exploration or development activity for any of these minerals and there are no dispositions.

Resource Management Objective

1. To provide opportunities for the exploration of mineral resources and the development of reserves once established.

Resource Management Guideline

1. Exploration and development of minerals will take into account the concerns for extensive recreation throughout the North Porcupine Hills resource management area, in particular the priority areas for trailheads and trails.

Access

There are several land use activities, either on-going or planned, in the North Porcupine Hills including petroleum and natural gas, range and forest management and recreation. Access throughout the resource management area has improved over time. A measure of control for recreational off-highway vehicle use through the development of an access management plan is indicated to promote use of existing roads and selected trails.

Resource Management Objective

1. The broad access management objectives apply.

Resource Management Guideline

1. An access management plan will be initiated for this resource management area where off-highway vehicle use will be directed to selected trails and access routes. The use of snowmobiles will be encouraged south of the Burke Creek road.

Implications of Resource Management Actions

Recreation

1. The delivery of recreation objectives in the North Porcupine Hills will necessitate close liaison between the Alberta Forest Service and Alberta Recreation and Parks. The promotion of dispersed extensive recreation opportunities in the North Porcupine Hills will call for special operating conditions (e.g., visual management guidelines) for domestic grazing and timber management to maintain presently high aesthetic values. These special operating conditions are not expected to have a significant adverse impact on the management of timber and range resources.

4.6 South Porcupine Hills Resource Management Area F

The primary intent for the South Porcupine Hills resource management area (Figure 12) is to provide a full range of multiple use activities managed to prevent adverse environmental impacts on watershed, wildlife and ecological resources.

The South Porcupine Hills form a distinct landscape in southern Alberta. Domestic grazing, one of the oldest land uses in the area, provides residents with a lifestyle that goes back to the turn of the century. The South Porcupine Hills are noted for a wider variety of values today including the production of provincially significant wildlife resources, and sustained yield timber production. Potential for natural gas also exists. This range of values has merited the designation of most of the resource management area as Multiple Use (Zone 5). The Critical Wildlife designation (Zone 2) accounts for critical winter range for elk.

The broad resource management objectives and guidelines stated in Section 2 apply to this resource management area. For brevity, they have not been repeated. Only resource management sectors with more detailed or specific objectives and guidelines are listed. The objectives provide a concise statement of a desirable condition or state for a resource or resource use. The guidelines describe a course of action to achieve these objectives. No priority is intended or implied by the sequence of the objectives and guidelines.

Watershed

The South Porcupine Hills are formed from resistant sandstone and shale overlain by medium-textured till. Till deposits are thin along

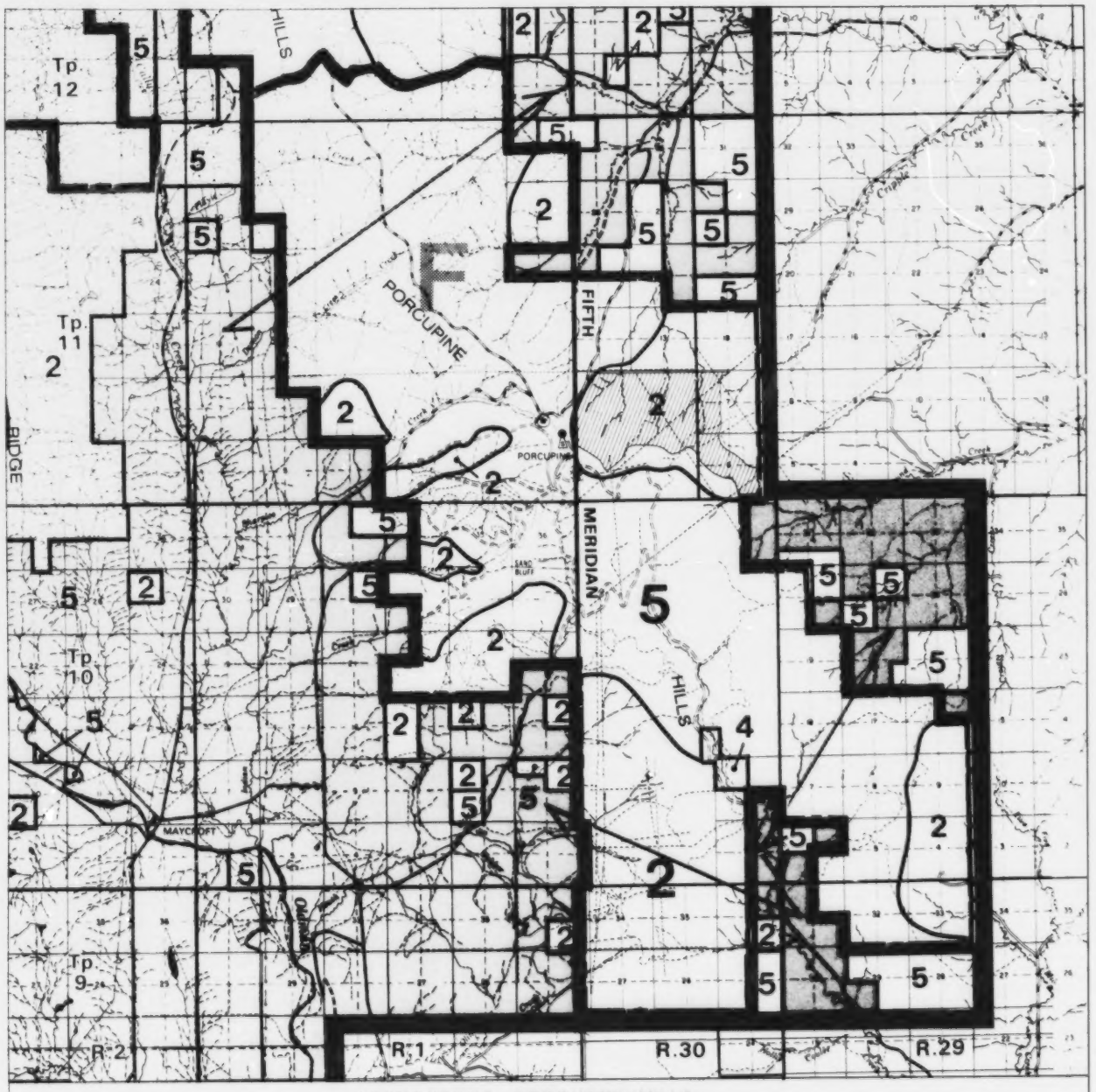


Figure 12 SOUTH PORCUPINE HILLS RESOURCE MANAGEMENT AREA

ridgetops where weathered bedrock forms the parent material. The only other significant deposits are fluvial gravel laid down along stream channels.

The vegetation is highly varied and local composition depends on elevation, slope and exposure. Douglas fir and lodgepole pine are found along ridgetops, extending to lowest elevation along north-facing slopes.

A mixture of lodgepole pine, white spruce and Douglas fir forests are found on upper slopes, while lower slopes support a mixture of aspen forest, Douglas fir forest and fescue grassland.

Environmental sensitivity in this area depends mainly on slope. Average slopes in the range of 15-30 per cent have a moderate sensitivity to erosion, while the erosion hazard is low on gentler slopes. The highest sensitivity is found on short, steep slopes that can reach 60 per cent and along stream channels where flooding is a hazard.

Resource Management Objective

1. To maintain a reliable, high quality water supply for onstream and downstream users.

Resource Management Guideline

1. The Alberta Forest Service, Fish and Wildlife Division and Alberta Environment will examine the feasibility of small water impoundments in the Porcupine Hills to sustain a recreational fishery, provide a ready water source for forest fire suppression, domestic grazing and wildlife, and to augment downstream water use.

Wildlife

The South Porcupine Hills resource management area supports a high level of recreational hunting opportunity for elk, deer, moose and cougar. The resource management area supports a high population of deer, summer and winter, probably supports the majority of Alberta's cougar population, as well as high densities of moose and a resident elk herd.

A system of selected recreational vehicle access routes and trails is required to secure ungulate winter ranges and to provide non-motorized recreational hunting within the resource management area.

Resource Management Objectives

1. To maintain current population levels of elk and deer in the resource management area.

2. To shift elk and deer summer/winter distribution to current, historical or underused ranges within the Rocky Mountain Forest Reserve.

3. To develop appropriate depredation management programs for private lands adjacent to the resource management area.

4. To develop a land management strategy to maintain the quality, quantity and security of ungulate winter ranges.

5. To actively manage moose habitat to maintain and increase moose populations.

6. To maintain recreational hunting opportunity, commercial trapping opportunity and non-consumptive uses of wildlife.

7. To reduce the negative impacts of land use activities on wildlife and wildlife habitat.

8. To maintain current levels of abundance and distribution of other wildlife species through maintaining diverse habitat types.

9. To assess population levels and key habitat requirements for cougars.

10. To maintain a forage base capable of sustaining the following wildlife populations:

    Elk - 325

    Mule Deer - 800

    White-Tailed Deer - 150

    Moose - 100

Resource Management Guidelines

1. The Fish and Wildlife Division will undertake an assessment of vegetative changes (succession, invasion) and land use practices on traditional winter ranges; current and potential carrying capacities for wildlife will be assessed and plans will be reviewed with the Alberta Forest Service for timber removal, integration with timber harvest, controlled burns, fertilization or access control to enhance the quality and security of winter ranges for elk and deer and year-round habitat for moose.

2. The Fish and Wildlife Division will complete a review of chronic depredation areas, the magnitude of depredation problems, livestock/elk conflicts, current control measures, efficiency of

current measures and will assess potential depredation control measures that might be undertaken on public lands within the resource management area.

3. The Fish and Wildlife Division will participate in the development of an access management plan in conjunction with the Alberta Forest Service to provide security for elk/deer winter range and to provide opportunities within the resource management area for recreational hunting of the non-motorized type.

4. The Fish and Wildlife Division will continue to conduct periodic, regular surveys of priority species to assess management, development or protection requirements.

Fisheries

Streams in the South Porcupine Hills resource management area have a severe limiting factor to sport fish production, namely the lack of a reliable flow of water. Lyndon Creek and beaver ponds on other streams provide some recreational fishing. Maintenance of high water quality is required to ensure downst5ream sport fisheries are not jeopardized.

Resource Management Objectives

1. To maintain a high quality water supply of sufficient quantity for sport fish production.

2. To protect the integrity of aquatic and riparian habitats critical for continued sport fish production.

3. To maintain current population levels and high productivity in sport fish.

4. To maintain current angler days of recreational fishing. To increase, where possible, recreational fishing opportunities.

Resource Management Guidelines

1. Recreational fishing opportunities should be increased, when demand warrants, by stocking suitable barren waters. Maintain current stocking programs for suitable beaver ponds and assess other locations suitable for stocking. Improve current opportunities through selected stream habitat enhancement techniques.

2. The Fish and Wildlife Division, in conjunction with the Alberta Forest Service, will identify roads and stream crossings that cause water quality problems (siltation). Problems will be eliminated through appropriate maintenance, reclamation or road closure. An assessment should be made of the impact of grazing

on riparian habitats and water quality and, where necessary, fence streambanks in consultation with grazing disposition holders.

Recreation

Recreation will not receive management emphasis in the South Porcupine Hills in terms of recreational facility development. An informal site used for off-highway vehicle staging in the Beaver Creek area will be upgraded to enhance motorized recreation opportunities.

Resource Management Objective

1. The broad recreation management objectives apply.

Resource Management Guideline

1. A random use site in the Beaver Creek area will be considered for development within the scope of Alberta Forest Service long range recreation plans.

Tourism

There is potential in this resource management area for extensive recreation and auto touring. Four-wheel drive vehicles and other off-highway vehicles can access a large portion of the area by selected access routes which could potentially open this area for more year-round recreational use including snowmobiling and cross-country skiing in the winter, and all-terrain vehicles, mountain bike and hiking in the summer months. It will be important from a user satisfaction perspective to maintain a separation between motorized and non-motorized recreationists.

There is potential to develop pull-off areas and scenic viewpoints but this will have to be weighed against the existing traffic on the Sharples Creek Road. This should be a more serious consideration after an increase in demand has been proven for this area.

Resource Management Objective

1. To assist the Alberta Forest Service and Alberta Transportation to determine the most appropriate locations for visitor facilities such as staging areas, trails, pull off areas, scenic viewpoints and selected trails at such time as visitor demand is proven for this resource management area.

Resource Management Guideline

1. Upon request, Alberta Tourism will review and provide input into plans for the recreational facilities in the South Porcupine Hills resource management area.

Ecological

The East Porcupine ecologically significant area is approximately 3 km^2 (3 sq. mi.) in size and contains a diversity of biophysical features of several natural regions, including the montane, subalpine and foothills aspen parkland. It includes the headwaters of several small streams that flow into Trout Creek, and part of the summit of the Porcupine Hills (Figure 12). The site is scenic and diverse, and contains significant values worthy of protection. The site includes species and communities restricted to southern Alberta such as lush, forb-rich foothills fescue grasslands; Englemann spruce, Douglas fir and subalpine fir woodlands along the north slope of Ecological Land Classification ecotype 5X1, extensive limber pine stands, seepage areas and lush forb meadows.

Resource Management Objective

1. To protect the ecological resources present within the site, including the diversity and rare species.

Resource Management Guidelines

1. Traditional uses including unimproved grazing and low intensity recreation will be maintained. Range improvements will be limited to the reduction of brush encroachment.

2. The value of the area from a regional and provincial perspective should be thoroughly analyzed to establish whether a special legislative designation such as a natural area is warranted.

3. A consultative notation will be placed on the East Porcupine area until the form of any further protection, such as a natural area, is approved and established. At that time, a management plan will be developed for the East Porcupine area.

Historical Resources

Only a few historical resource inventories have been conducted in the South Porcupine Hills resource management area. A number of prehistoric sites have been identified along small drainage systems in the west Porcupine Hills. Very high potential for sites of major significance exists because of the unique geological and topographical

nature of the area. Quaternary geologists contend this area escaped glaciation during all except the earliest portion of the Pleistocene. Alley (1973) suggests ridges above 1 700 metres (5 577 feet) were never affected by glacial ice. These ridges correspond closely with Ecological Land Classification ecotype 5X1 and are characterized by gentle to steep slopes (5-30 per cent) with Douglas fir and Douglas fir-lodgepole pine as most common cover types (Alberta 1979). If, as is widely believed, North America was originally populated by groups migrating south from Beringia a long the Eastern Slopes of the Rocky Mountains, then sites dating to much earlier than 12 000 years could be located in this area in an undisturbed context. The oldest know site in Canada which dates to 15 000 years is located in the Yukon. Sites of a similar age or older may be discovered in the Porcupine Hills. Such an occurrence would be of major significance. These sites and more recent sites may be in areas such as terraces above streams and rivers, elevated areas suitable for game observation and exposures of bedrock or cobbles suitable for stone tool manufacture. Similarly, rock shelters or caves have high potential for the discovery of very early sites. Additionally, the lack of glacial activity in the area may have resulted in extremely deep burial of early sites, consequently, dry coulees and other types of sediment traps may contain evidence of early occupations.

Very little work has been done on the paleontological resources of the area. These resources are widespread and varied and there is potential for fossils virtually anywhere that strata is exposed. Areas of high potential are considered to include exposures along streams and rivers, steep slopes and major roadways.

The region was the focus for early coal mining, ranching and forestry activity. The remains of several of these sites may exist throughout the resource management area.

Resource Management Objective

1. The broad historical resource objective applies within the resource management area.

Resource Management Guideline

1. The Archaeological Survey of Alberta, Resource Management Section will participate in the land use referral process to review any proposed developments involving land surface disturbance on lands:

   (a) within Ecological Land Classification ecotype 5X1 in the Porcupine Hills because of the extremely high potential for archaeological sites of provincial, national or international significance; and,

(b) adjacent to Burke Creek and its tributaries; Muddypound Creek, Beaver Creek and its tributaries; Sharples Creek, Indian Creek, Michael Coulee, and Heath Creek.

Timber

The timber resources in the South Porcupine Hills resource management area are predominantly in the immature to mature age-class with significant volumes in the young and over-mature age classes. Of the commercial species, pine is more prevalent than spruce and interior Douglas fir that constitute the majority of the over-mature age-class.

The occurrence of the mountain pine beetle has been heavy throughout the resource management area. A control program has been initiated and has reduced the impacts of the infestation.

The resource management area contains a portion of a timber quota sphere of influence held by Johnson Brothers Sawmills Ltd. The emphasis for forest management in the South Porcupine Hills will include the provision and maintenance of a sustained-yield land base capable of satisfying both commercial and local demands for forest products. Treatments will continue in an effort to control the mountain pine beetle and to provide stable forest conditions.

Resource Management Objective

1. To maintain the forest resource and land base capable of satisfying both commercial and local demands for forest products.

Resource Management Guidelines

1. Treatments will continue in an effort to control the mountain pine beetle throughout the resource management area.

2. Timber management plans will integrate harvesting and reforestation with other land uses such as domestic livestock grazing, wildlife habitat management, hunting and other dispersed recreational pursuits, and ecological features representative of the Montane Ecoregion in the Porcupine ecologically significant area.

Range

Grazing of domestic livestock is a longstanding land use in the South Porcupine Hills.

There are 12 complete grazing allotments within the resource management area: Lookout Butte, Sharples Creek, Hardwick Coulee, Ewing, Muddy Pond, Beaver Creek, Jim Heath Creek, Meade Creek, Michael Coulee, Burles Creek, Webber Creek and Olin Creek. Burke Creek and Chimney Rock are two allotments partially contained in this resource management area.

The permitted stocking rate on grazing allotments in the resource management area is estimated at 9 767 animal unit months for domestic grazing purposes.

The emphasis for range management will generally be placed on range improvements required as a result of brush encroachment and aspen invasion. The use of fire prescribed for range management purposes will be considered. Range improvement projects will be specifically addressed through revised range management plans.

Resource Management Objective

1. To provide a forage base that is capable of supporting an estimated 9 767 animal unit months.

Resource Management Guideline

1. Range management plans and subsequent improvements will be coordinated through the referral process to include provisions for wildlife habitat and ecological features representative of the Montane Ecoregion in the East Porcupine ecologically significant area.

Minerals

About 15 per cent of the Porcupine Hills South area is disposed in petroleum and natural gas agreements. Only two wells, both unsuccessful, have been drilled. Some success in the vicinity is likely to spur exploration in the source management area. There is no disposition nor exploration for other minerals, although coal seams are known to occur.

Resource Management Objective

1. To provide opportunities for the exploration of mineral resources and the development of reserves once established.

Resource Management Guideline

1. Zone 2s in the South Porcupine Hills resource management area provide critical winter range for elk and are important for other regionally and provincially significant species (e.g. cougar). Special operating conditions (i.e. timing, extent and intensity of minerals exploration and development, access control and reclamation or mitigation) will be necessary to minimize impacts on wildlife.

Access

There are several land use activities, either on-going or planed, in the South Porcupine Hills including petroleum and natural gas, range

and forest management and recreation. Access throughout the resource management area has improved significantly over time. A measure of control for recreational off-highway vehicle use through the development of an access management plan is indicated to promote use of existing roads and selected trails.

Resource Management Objective

1. The broad access management objectives apply.

Resource Management Guideline

1. An access management plan will be initiated for this resource management area to direct off-highway vehicles to selected trails and access routes. The use of snowmobiles will be encouraged in this resource management area.

Implications of Resource Management Actions

Ecological

1. Provisions are made for range improvement to reduce brush encroachment in the East Porcupine ecologically significant area.

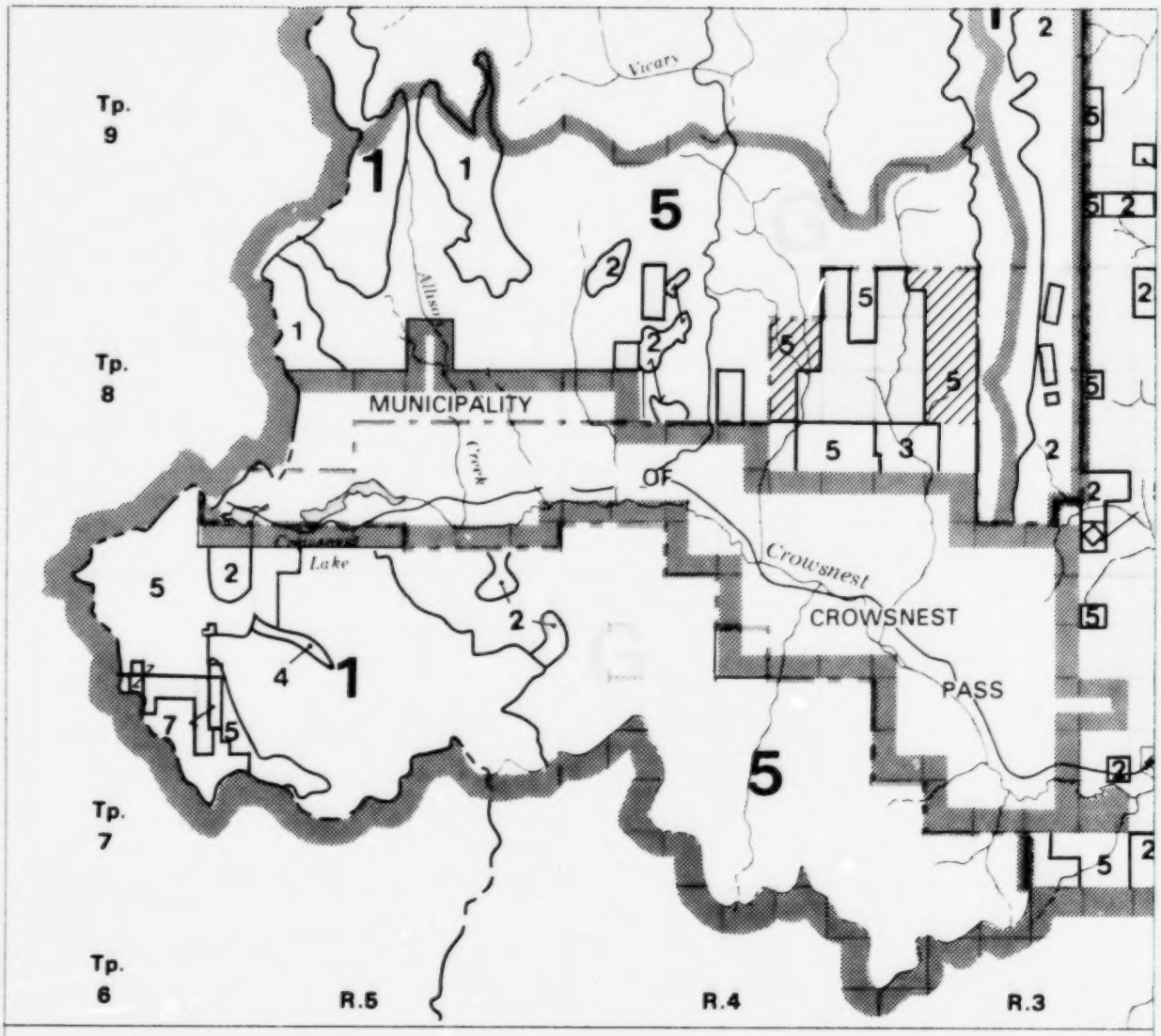
4.7 Crowsnest Watershed Resource Management Area G

The primary intent of the Crowsnest Watershed resource management area (Figure 13) is to provide a full range of multiple use activities managed to maintain high watershed quality, and to recognize the social and economic needs of the Crowsnest Pass.

The majority of the resource management area to the north and south of the Municipality of Crowsnest Pass has been designated Multiple Use (Zone 5). Lands under this designation will provide for the management and development of the full range of available resources. Watershed protection will continue to be the priority in this, as in other, Eastern Slopes zones.

The Critical Wildlife Zone serves to identify several areas in the Crowsnest Watershed that are crucial to the survival of terrestrial species. The location of the zone, key species to be protected and the rationale for its use are provided in Table 5.

The Prime Protection Zone generally conforms to the Alpine and includes portions of the Sub-alpine that have high terrain sensitivity. Areas of high esthetic value and sensitivity, such as the Ptolemy Creek Valley - are also included in Prime Protection in keeping with the intent of this zone. A portion of the Ptolemy Valley has been zoned General



LIVINGSTONE - PORCUPINE HILLS

Scale 1 : 200 000

RESOURCE MANAGEMENT AREA G

Crowsnest Watershed

- Planning Area Boundary
- Resource Management Area Boundary
- Patent Land
- White Area Lands with Multiple Values
- Rocky Mountain Forest Reserve Boundary

REFINED EASTERN SLOPES ZONING

1 Prime Protection
2 Critical Wildlife
3 Special Use
4 General Recreation
5 Multiple Use
6 Agriculture
7 Industrial
8 Facility

Figure 13 CROWSNEST WATERSHED RESOURCE MANAGEMENT AREA

Recreation to accommodate summer recreational vehicle use along a designated trail.

Table 5

Critical Wildlife Zones in the Crowsnest Watershed

Location	Target Species	Rationale
Island Ridge	Sheep Elk	Winter Range
Adjacent to York Creek	Sheep Elk	Winter Range
McGillivray Ridge and Saskatoon Mountain	Elk	Winter Range
Star Creek	Elk	Winter Range

The Lille Townsite area, recently acquired by Alberta government has been designated Special Use (Zone 3).

The Industrial Zone (Zone 7) identifies Tent Mountain coal mining property.

The Green-White Area boundary was drawn in 1948 at a provincial scale to separate lands important for multiple uses (Green Area) from those to be set aside for settlement and cultivation (White Area). Realignment of this boundary on the basis of more detailed inventory information is a general objective of integrated resource plans. In the Livingstone-Porcupine Hills planning area, the Green-White Area boundary located north of the Municipality of Crowsnest Pass was assessed by the Alberta Forest Service and Public Lands Division. Nineteen public quarter sections (Figure 13) in the White Area have been deemed unsuitable for agricultural disposition because of their biophysical characteristics. There areas are mountainous and heavily forested. The most appropriate management strategy for these areas therefore includes watershed protection, and wildlife, recreation and timber management. Government stewardship is necessary so these multiple values can be maintained in perpetuity.

The broad reArea lands adjacent to the Rocky Mountain Forest Reserve.

Resource Management Guidelines

1. Reclamation projects proposed for the Ptolemy Creek, Allison

Creek/Deadman's Pass and Byron Creek areas will be evaluated and undertaken subject to reclamation policies and funding according to availability and provincial priorities.

2. A protective notation will be entered to indefinitely suspend the sale of Sections 20, 29, 32 and NE 31-8-3-W5M and Section 26 and the W 1/2-8-4-W5M to preserve this area's watershed values.

Wildlife

The Crowsnest Watershed resource management area contains key habitats for elk, sheep and moose. Recreational hunting and commercial trapping are important components. Winter ranges for sheep are found on Island Ridge, the Ptolemy Creek Valley, the Star Creek drainage and on the Livingstone Range. Resource developments, primarily logging, have provided potential for increases in ungulate populations and for shifts in winter/summer distribution patterns.

Resource Management Objectives

1. To increase the number and distribution of elk, sheep, moose and goats using the resource management area on a year-round basis.

2. To promote elk and sheep winter use of former or currently underutilized wintering areas.

3. To encourage the increase or re-establishment of goat populations on vacant or underutilized ranges.

4. To promote forest management practices to enhance moose habitat.

5. To maintain recreational hunting and commercial trapping opportunities and non-consumptive uses of wildlife.

6. To reduce the negative impacts of land use activities on wildlife and wildlife habitat.

7. To minimize wildlife depredation on private lands adjacent to the resource management area in the Municipality of Crowsnest.

8. To maintain current levels of abundance and distribution of wildlife species by maintaining diverse habitat types.

9. To maintain a forage base capable of sustaining the following wildlife populations:

   Sheep - 65 in summer and 80 in winter

   Goats - 25

Elk - 200 in summer and 100 in winter

Mule Deer - 400 in summer and 100 in winter

White-Tailed Deer - 100 in summer

Moose - 50

Resource Management Guidelines

1. The Fish and Wildlife Division will assess vegetation changes (succession, invasion) on traditional use areas; current and potential carrying capacities will be assessed. Plans will be reviewed with the Alberta Forest Service for timber removal, controlled burns, fertilization or access control to enhance the quality and quantity of historical winter ranges for sheep and elk.

2. The quality, quantity and security of elk summer range and moose range will be enhanced through integration of logging plans with the Alberta Forest Service, selection of vehicle access routes, in parts of the resource management area reduction of impact of land use activities through timing constraints, access closures or mitigation and assessment of range improvement techniques.

3. An assessment of opportunities to increase and expand mountain goat populations primarily through relocation should be undertaken by the Fish and Wildlife Division. This will allow a limited goat harvest and will increase opportunity for recreational hunting.

4. The Fish and Wildlife Division will continue to conduct regular surveys of priority species to assess management, development or protective requirements.

Fisheries

The Crowsnest Watershed resource management area contains several productive and popular streams such as Allison, McGillivray, Blairmore, York and Crowsnest creeks. Sport fishing of streams in the resource management area is popular; maintenance of high quality watershed values in resource development is critically important to protect the Forest Reserve.

Resource Management Objectives

1. To maintain a high quality water supply of sufficient quantity for sport fish production.

2. To protect the integrity of aquatic and riparian habitats critical for continued sport fish production, primarily spawning, rearing and overwintering areas on tributaries to the Crowsnest River.

3. To recognize and protect the integrity of the Allison Creek drainage and Chinook Lake drainage for trout brood rearing purposes.

4. To maintain current population levels and high productivity in sport fish populations.

5. To maintain current angler days of recreational fishing. To increase, where possible, recreational fishing opportunities.

Resource Management Guidelines

1. Activities in the Allison Creek watershed and Chinook Lake watershed will be reviewed according to fisheries habitat protection guidelines for brood stations to limit the impact of land uses on water quality and quantity.

2. Recreational fishing opportunities will be reviewed, when demand warrants, by stocking suitable barren waters with cutthroat tour. Current opportunities should be improved through selected lake and stream habitat enhancement techniques.

3. The Fish and Wildlife Division, in conjunction with the Alberta Forest Service, will identify roads and stream crossings where water quality problems (siltation) can be eliminated through appropriate maintenance, reclamation or road closure.

4. The Fish and Wildlife Division will continue to conduct regular surveys of streams and lakes to assess management requirements, angler use, habitat development potential and habitat protection needs.

Settlement

The Municipality of Crowsnest Pass is centrally located in the Crowsnest Watershed resource management area. Over 60 per cent of the municipality's land base is titled to mineral resource companies or is held as public land. Virtually all lands north and south of the municipality in the resource management area are public and administered through legislation by several Alberta government resource management agencies.

Because the municipality's economy is largely natural resource based, the use and management of public lands and resources in the area can have a significant influence on the local economy. The Municipality

of Crowsnest Pass has expressed a desire for greater communication with Alberta public land and resource managers to ensure urban land use objectives and natural resource management objectives are more closely aligned and consistent with one another.

Resource Management Objective

1. To allocate and manage natural resources in the Crowsnest Pass so as to optimize local social and economic benefits.

Resource Management Guideline

1. A local integrated resource plan will be prepared for public lands and resources within the Municipality of Crowsnest Pass. The plan will be prepared in consultation with the municipality, interested industrial and commercial users, and the general public.

Recreation

There are no formal recreation facilities in this resource management area. As with most of the planning area, recreational pursuits such as hunting and fishing are prevalent. Summer and winter off-highway vehicle use and random camping also occurs in this resource management area. A formalized snowmobile trail system originates from a staging area on the Atlas road (south of this resource management area) and provides approximately 16 kilometres of groomed trails in the Chinook Lake area. A portion of the Great Divide Trail has been proposed in the Deadman Pass area through to the Allison-Chinook cross-country ski area immediately south of the resource management area. A small portion of the Forest Land Use Zone in the Allison-Chinook area is located in this resource management area.

Nineteen White Area quarter sections of public land are scenic and provide extensive recreation opportunities. Assurance of public stewardship is necessary to sustain benefits from this resource in perpetuity.

Resource Management Objectives

1. To provide opportunities for dispersed recreation activities with provision for motorized recreation where this use is compatible with other land uses and environmental constraints.

2. To manage 19 White Area quarter sections of public land (Figure 13) for extensive recreation values.

Resource Management Guidelines

1. The Crowsnest Mountain area has been identified as having potential for recreational development over the long-term, for hiking.

2. A protective notation will be entered to indefinitely suspend sales of Sections 20, 29, 32 and NE 31-8-3-W5M and Section 26 and the W 1/2-23-8-4-W5M to preserve this area's extensive recreation values in perpetuity.

3. Commercial development, residential subdivision and serviced camping will not be permitted in the Ptolemy Creek Valley Zone 4.

Tourism

The Crowsnest Watershed resource management area is of significant importance to both tourists travelling through the area on Highway 3 and residents of the municipality and surrounding area. In 1984, in the region of the Municipality, Highway 3 received a daily average of 6 840 vehicles during the summer months, approximately 20 per cent of those being recreational vehicles. The Forestry Trunk Road is also an important tourist route due to its significant scenic qualities.

Tourists through the area are using the Crowsnest Pass for a service centre and many of the residents rely upon the resource management area for their recreational enjoyment. Based upon the area's rich historical, cultural, and recreational resources, there is potential to expand visitor use and interest. Tourism opportunities should be focused in the Municipality of Crowsnest due to the existing infrastructure, services and facilities.

Tourists facilities outside the municipality are limited to forestry campgrounds. Only unique opportunities for facility development which cannot be accommodated, or are not appropriate, in the Municipality of Crowsnest will be considered in the remainder of the resource management area.

Resource Management Objectives

1. To recognize the Forestry Trunk Road as an important auto touring route.

2. To provide opportunities for the private sector to meet the needs of the area's recreational users where appropriate, while recognizing that the Municipality of Crowsnest Pass contains tourism services and facilities.

Resource Management Guidelines

1. Any future major road upgrading plans for the Forestry Trunk Road should consider the development of scenic viewing pull-off areas. The Departments of Tourism and Culture will assist Alberta Transportation and Utilities in identifying appropriate sites.

2. Planning assistance will be provided to existing and potential tourism operators and any local community groups interested in providing tourist services or facilities in this resource management area.

Ecological Resources

The Ptolemy Valley situated south of the Crowsnest Pass has been designated Zone 1 and 4. The valley is deeply incised and therefore highly sensitive to surface disturbance. The area is highly valued for its extensive system of karst caves. The caves are of scientific and educational interest.

Resource Management Objective

1. To protect the natural values of the Ptolemy Valley and the Ptolemy Caves.

Resource Management Guideline

1. Recreational off-highway vehicle access will be restricted to an existing trail in the Ptolemy Valley (Refer to "Access" section for further direction).

Historical Resources

Historical resource inventories conducted in the resource management area have not been systematic; however, these studies have identified concentrations of prehistoric sites along some of the major drainage systems including Allison and Gold creeks. A series of intermontane passes exist in this area which undoubtedly provided important travel corridors between the Oldman drainage system and the Elk-Kootenay River systems of British Columbia. These include Deadman, Phillips, Tent Mountain and Ptolemy passes. Prehistoric sites have been identified at the summits or along the approaches to some of these passes and it is expected that other sites will be discovered in these areas.

The presence of exploitable plant and animal resources at high elevation would have provided additional incentive for summer occupations in these areas. Alpine passes and meadows, terraces above streams and rivers, lakeshores, exposed grassy meadows, and exposures of bedrock or cobbles suitable for stone tool manufacture, are also considered to be areas of high historical resource potential.

At present, very little work has been done on the paleontological resources of the region. These resources are widespread and varied and there is potential for fossil occurrences virtually anywhere that strata is exposed. Areas of high potential include exposures along streams and rivers as well as steep slopes and ridges above the tree line, and in excavations such as coal mines or major road construction or widening.

Historically, the region was the focus for early coal mining, ranching and forestry activity. The remains of structures relating to these activities may exist throughout the resource management area and would be of interest of Alberta Culture.

Lille was first established in 1901 as French Camp, after coal with potential for exploitation was discovered in the Grassy Mountain area. Initially the mines at French Camp were linked to Frank and the CPR line by a pack trail, which eventually widened to a cart track. In 1903 a spur was constructed by the mine owners along Gold Creek. On April 29, 1903, the Frank Slide destroyed one half of the line, interrupting mine operations until new track was completed in November. Also in 1903, French Camp was re-named Lille after the home in France of the company's principal shareholders. After a productive ten years, the operations at Lille were closed down due to decreasing markets and a lowering of the grade of coal.

Lille has been called the only true ghost town on the Alberta side of the Crowsnest Pass. For many years, the few physical remnants of the community remained virtually intact. Recently, the significance of coal mining in Alberta's modern history and, in particular, the Crowsnest Pass has received renewed recognition. The region's economy is coming to recognize the value of tourism and as a consequence mining artifacts and remains have come to be viewed as valuable resources. Lille townsite was declared a Provincial Historic Site in 1978, providing it with legal protection against further theft and damage by vandals.

Resource Management Objectives

1. To protect historical resources (archaeological, historical and paleontological) from potential or actual impact related to future resource developments; and to conserve these resources for future generations.

2. To protect the Lille Townsite area from physical or visual impact and to preserve this resource for future generations.

Resource Management Guidelines

1. The Archaeological Survey of Alberta, Resource Management section will participate in the land use referral process to review proposed developments in the following areas deemed to have historical resource potential:

(a) Lands adjacent to tributaries of the Crowsnest River.

(b) Potential archaeological and paleontological sites on ridges and slopes above the tree line, including the Grassy Mountain (Fernie Formation) and Blairmore Range (Blairmore Formation) areas.

2. All proposals for development within the Lille Townsite Zone 3 shall be referred to Alberta Culture.

3. The N 1/2 of Section 18-8-3 W5M in Zone 3 is designated a Provincial Historic Resource. The area will be managed in accordance with Section 16 (9) of the Historical Resources Act which states "no person shall (a) destroy, disturb, alter, restore or repair any historic resource or land that has been designated under this section or (b) remove an historic object from a historic resource that has been designated under this section without the written approval of the Minister."

Timber

The timber resources in the Crowsnest Watershed resource management area are mainly in the immature and mature age-classes with areas of regenerating stands from past harvesting operations and pockets of timber in the over-mature age-class. Of the commercial species, pine and spruce dominate with interior Douglas fir present, to a lesser degree.

The resource management area contains a quota sphere of interest held by Chinook Coals Ltd.

Local demand for forest products will be satisfied through the provision and maintenance of miscellaneous timber use (MTU) areas in the Allison Creek, McGillivray Creek and Byron Creek areas. The MTU areas will provide an estimated 4 618 m^3 (1 076 mFbm) on an annual basis.

The occurrence of the mountain pine beetle has ranged from light concentrations north of the Municipality of Crowsnest Pass in the Blairmore Creek area, to heavy concentrations in the resource management area south of the Municipality.

The emphasis for forest management in this resource management area will include the maintenance of a sustained-yield land base capable of satisfying both commercial and local demands for forest products. Treatments will continue, as required, in an effort to control the occurrence of mountain pine beetle populations and provide stable forest conditions.

Nineteen White Area quarter sections (Figure 13) adjacent to the forest reserve have potential for sustained yield timber management.

Resource Management Objectives

1. To maintain a sustained yield land base capable of satisfying both commercial and local demands for forest products.

2. To manage the 19 White Area quarter sections of public land that are contiguous with the Rocky Mountain Forest Reserve and have value for timber production, as part of the sustained yield land base.

Resource Management Guidelines

1. Timber harvesting operations will be located in the Island/Crowsnest Creek, York Creek, Lyons Creek, Pelletier Creek, McGillivray Creek and the Cauldron/Gold Creek areas in the Rocky Mountain Forest Reserve.

2. An estimated 4 618 m^3 (1 076 mFbm) on an annual basis will be available for use by local residents from the Allison Creek, McGillivray Creek and Byron Creek miscellaneous timber use (MTU) areas. The Great Divide Trail, at the proposal stage, may be located in the Allison Creek MTU area. The trail and local demand for forest products will be examined before final location of the trail. Local demand for forest products in the Allison Creek MTU area will be co-ordinated with cross-country skiing and reviewed with respect to watershed protection concerns related to the Allison Creek Trout Brood Station.

3. Treatments will continue, as required, in an effort to control and minimize the occurrence of mountain pine beetle populations.

4. A protective notation has been established to protect a stand of western larch found in NE LSD 14, Sec 2 and E 1/2 LSD 2, Sec 11, T.8-R.6-W5M for seed production purposes.

5. Nineteen quarters of White Area public land north of the Municipality of Crowsnest Pass are valued for sustained yield timber production. Public stewardship of these lands is necessary for sustained use of the timber resource. A protective notation will be entered to indefinitely suspend sales for Sections 20, 29, 32 and NE 31 of 8-3-W5M and Section 2 and the W 1/2 23 of 8-4-W5M (Figure 13).

6. Commercial logging will be permitted in the Ptolemy Valley Zone 4. Only sanitation logging will be considered.

Range

There are five grazing allotments within this resource management area; Allison-McGillivray, Blairemore-Cold, Star Creek, Lyons Creek and

Byron Creek. The permitted stocking rate in this resource management area is estimated at 1 039 AUMs. If range improvements are undertaken, they will be conducted to reduce brush encroachment. The emphasis for range management will be placed on maintaining the productivity on existing grasslands as well as better use of the secondary ranges. The use of cutblocks as temporary range to supplement existing rangelands will also be considered in this area.

There are two grazing leases in the White Area portion of the resource management area north of the Municipality of Crowsnest Pass. These dispositions will be maintained at present stocking levels.

Resource Management Objectives

1. To provide a forage base capable of supporting 1 039 AUMs in the Rocky Mountain Forest Reserve portion of the resource management area.

2. To maintain the current level of AUMs of domestic grazing on existing grazing dispositions in the White Area north of the Municipality of Crowsnest Pass.

Resource Management Guidelines

1. The existing forage base with grasslands to their fullest potential. Range improvements will be limited to reducing brush encroachment and will include provisions for wildlife habitat.

2. The use of cutblocks as temporary range will be considered on a site-specific basis to supplement existing range resources. Grazing will be phased and controlled to ensure the establishment of coniferous regeneration. As cutblocks will be considered temporary range only, they will not be included in the long-term calculations of carrying capacity.

Minerals

The Crowsnest Watershed resource management area is underlain by the major coal bearing formations of the Kootenay group. The coal resources associated with these formations have been designated by the ERCB into four distinct coal fields: Bellevue, Blairmore, Coleman and Tent Mountain. These fields are comprised of a number of individual coal deposits. For those deposits that fall within the Crowsnest Watershed resource management area, eligible data indicate initial established in-place resources totalling 866 megatonnes (ERCB Report ST 87-31). Of these, 222 megatonnes (116 surface and 106 underground) are considered recoverable using existing mining technology.

As many as 15 mines have been recorded for the Crowsnest Watershed resource management area (ERCB Report 85-45). Together these

have produced in the order of 60 million tonnes of coal, mostly from underground workings. The largest surface mining venture was undertaken by Coleman Collieries Ltd. on Tent Mountain. This relatively recent mine ceased operations in 1979. Since then there have been no mining activities but there remains a strong potential for future developments. The abundance of reserves and proximity to existing transportation corridors are favorable factors. Virtually all of the major coal seams are under disposition either as Crown lease agreements or as freehold mineral rights.

The Coleman gas field, which is split between the West Livingstone and Crowsnest Watershed resource management areas, was discovered in 1969. It is relatively small in areal extent and contains just four productive wells. The field had initial established reserves of 4 100 x 10^6m^3 of marketable Rundle and Palliser formation gas (ERCB Report ST 86-18). More than one-third of these known reserves have been recovered and if production continues at current rates, with no new reserves being found, it will be another 20 years until the remaining recoverable reserves (2 590 x $106m^3$) are exhausted.

The raw gas from the Coleman field contains high concentrations of toxic hydrogen sulphide (H^2S) which requires special safety measures during all phases of drilling and recovery, until the sulphur is reduced to its elemental state. This by-product of gas processing is in itself an important resource. The Coleman field, with a remaining recoverable sulphur reserve of 1 416 x 10^3 tonnes (ERCB Report ST 86-18) has the 18th largest potential in the province.

Two main pipelines traverse the Crowsnest Watershed resource management area. They connect the Coleman and Savanna Creek sour gas fields to the Saratoga gas processing plant just west of Coleman. This plant was built in 1962 and has a raw gas capacity of 1 465 10^3m^3/day (Gas Processing Plant Capacities, Oilweek Supplement, Jan. 16, 1984).

Outside of the Coleman gas field interest in exploring for new reserves of gas has waned. Barely two sections of Crown mineral rights are leased and only two wells (both now abandoned as dry holes) have been drilled.

The Crowsnest Pass area has been and still is important for quarriable mineral production, in particular for limestone. Nine quarriable mineral leases and six lease applications are located in the resource management area along Ptolemy Creek and in Deadman Pass. All of these agreements are held by Summit Lime Works Ltd., the company which runs the lime operation in the Crowsnest Pass. This plant is one of only three such lime works in the province and therefore represents a significant contribution to the regional and provincial economy.

There is a strong desire by the company to maintain sufficient supplies of quarriable limestone to ensure uninterrupted operations of the plant.

Resource Management Objectives

1. To provide opportunities for renewed exploration and development of coal reserves particularly where major deposits have been identified.

2. To provide opportunities for the orderly exploration and development of hydrocarbons.

3. To provide opportunities for industry to define the limits of and recover the reserves within the productive geologic structures of the Coleman gas fields particularly since there is an existing commitment to its development under A Policy for Resource Management of the Eastern Slopes, Revised 1984.

4. To maintain opportunities for the recovery of limestone in order to support the continued operation of the lime plant in the Crowsnest Pass.

5. To provide opportunities for the private sector to explore and develop quarriable and metallic mineral resources.

Resource Management Guidelines

1. In view of the significance of critical wildlife (Zone 2) lands in the resource management area for elk and sheep winter range and elk migration routes, special operating restrictions (i.e. timing of exploration activities, access closures and reclamation standards) will be necessary to minimize impacts on wildlife (Refer to Table 5 for a statement of management emphasis for Zone 2s in the resource management area).

2. Development of petroleum and natural gas, quarriable, metallic and aggregate minerals will be permitted in Critical Wildlife Zones where it can be demonstrated that there is no net loss in wildlife habitat, disruption of wildlife populations and loss of recreational values. Operating conditions will consider access restrictions, low duration and intensity of development and complete reclamation or mitigation.

3. Localized geophysical activity and step out drilling may be permitted in Zone 1s on a very limited scale and under stringent operating conditions where it is deemed justified in order to define the limits of, or to recover the reserves of the Coleman gas play.

4. Coal exploration will be permitted in Zone 2s in the Crowsnest Watershed resource management area. Any subsequent development of the coal resource will be determined through a preliminary disclosure and regulatory approvals. Potential wildlife management conflicts arising from coal exploration or development in Zone 2s must be mitigated as a condition of approval.

5. The development of quarriable, metallic, aggregate or coal resources will not be permitted along Allison Creek because of the importance of a high quality water supply to the Allison Creek Trout Hatchery downstream in the Crowsnest Pass.

6. Exploration will be permitted on existing quarry leases in Zone 1 immediately west of Deadman's Pass. Development will be considered through preliminary disclosure.

7. Exploration and development of minerals will not be permitted in the Ptolemy Valley Zone 4.

Access

As with the West Livingstone resource management area to the north, resource development in the Crowsnest Watershed resource management area has created a higher degree of access relative to other resource management areas. The use of recreational off-highway vehicles is prevalent throughout the resource management area and is anticipated to continue.

Resource Management Objective

1. The broad access management objectives apply.

Resource Management Guidelines

1. Off-highway recreation vehicle uses including snowmobiles, all-terrain vehicles, bikes and 4x4s will be permitted on an informal basis in this resource management area exclusive of Zones 1 and 2. The use of that portion east of the Atlas Road in this resource management area will be encouraged considering environmental constraints north of the Municipality of Crowsnest Pass. South of the municipality the use of existing trails will be encouraged west and north of the Lyons Creek road and east of the Eastern Slopes Zones 1 and 2 containing the Flathead Range.

2. Snowmobile use through the Deadman Pass area will be considered during the development of an access management plan.

3. Recreational off-highway vehicle access will be restricted to summer use on an existing trail in the Ptolemy Valley. Stream crossings will be monitored and replaced, repaired or stabilized

as required. Should trail conditions warrant, wet areas may be hardened using locally available coarse materials. A terminal point will be established beyond which only non-motorized access will be permitted.

Implications of Resource Management Actions

Fisheries

1. Reclamation projects, particularly in the Allison Creek watershed will reduce siltation and will protect high water quality standards required for brood trout operations.

2. Development of coal resources in Zone 2 will have an adverse impact on elk winter range that will require reclamation and mitigation to compensate for habitat losses.

Timber

1. Local use of the miscellaneous timber use area will be integrated with the Great Divide Trail objectives in the Allison Creek area.

2. Nineteen quarter sections of public White Area land will be managed for watershed values, extensive recreation and sustained yield timber management. It is estimated that the 19 quarters could contribute 821 m^3 (191 mFbm) on an annual allowable cut basis. These lands will be reserved by notation from sale to maintain timber and other sustainable values in perpetuity.

Minerals

1. The extension of the Flathead Range Zone 1 westward onto Island Ridge has the implication of lost coal exploration and development opportunities on one section of land, and the probable sterilization of some of the coal resources associated with the recently mined Tent Mountain coal field. Existing coal leases and freehold mineral rights are not affected.

2. The expansion of Zone 1 lower into Deadman Pass means that portions of Quarrying Lease 1982050001 and 1982050002 are now unavailable for limestone extraction. Development work has not been conducted on the limestone resources here but the area is considered to be one of the future supply options for the Summit Lime Works Ltd. operation in the Crowsnest Pass. Because allowances have been made in the plan for quarriable mineral exploration on the Zone 1 portions of the two leases, the company will have the opportunity to assess the resource to determine whether potential exists for future development.

3. The re-zoning from Prime Protection to Multiple Use along Crowsnest Creek just east of Island Ridge will permit, for this area, the continuance of some of the existing lease commitments to Summit Lime Works Ltd. for limestone exploration and development.

5. PLAN MANAGEMENT

General administrative procedures and mechanisms required for plan implementation, monitoring and amendment are outlined in this section. Detailed program and project implications as a result of this plan will be contained in an implementation document which will complement the plan.

5.1 General Administration

The Livingstone-Porcupine Hills Integrated Resource Plan will be implemented within the terms of appropriate legislation, regular programs and activities of the government, operational plans, specific developed projects, referral processes and administrative bodies. The revised zoning provides a means of processing applications for new public land dispositions within the planning area. Existing systems for referral and interdepartmental review will apply to the plan. Resources will continue to be administered by the departments responsible, in line with the approved zoning, resource management guidelines and any operational plans.

Government management agencies participating in the Livingstone-Porcupine Hills Integrated Resource Plan will have several responsibilities to ensure the effective delivery of this plan. It will be their responsibility to deal with conflicts or concerns with respect to implementation or interpretation of any of the plan's provisions. These responsibilities are outlined by subject area below.

Referral Systems: Participating government management agencies will ensure that existing referral systems of the Alberta government are adequate to encompass all affected or concerned agencies.

Plan Monitoring: The Livingstone-Porcupine Integrated Resource Plan will be reviewed annually by the Southern Regional Resource Management Committee to:

-- assess the relevance of the stated resource objectives in light of changing conditions;

-- assess the resource management guidelines and referral procedures;

-- assess agency operational plans to ensure their consistency with the Livingstone-Porcupine Hills resource management area intents, objectives and guidelines; and

-- recommend amendments to the Livingstone-Porcupine Hills Integrated Resource Plan and future actions required to maintain or promote government resource management activities in the planning area.

An annual report will be prepared by the Southern Regional Resource Management Committee. The report will highlight the previous year's activity in the planning area. The report will also indicate what might be expected to be accomplished in the planning area during the next year. The report may be deferred if there is a lack of activity or progress on government resource management objectives within the planning area.

A major plan review by the Southern Region Regional Resource Management Committee will occur at times when the plan is considered out-of-date due to significant changes and new priorities:

-- a comprehensive assessment of all aspects of the plan, including but not limited to broad resource management objectives, land-use zoning, and resource management area boundaries and intents;

-- a public review on the same basis as the public is involved in the development of new integrated resource plans; and

-- a statement recommending amendments to the plan and future actions required to maintain or promote government resource management activities in the planning area.

5.2 Amendment Procedures

Changes to the planning area boundary, broad planning area resource management objectives, land-use zoning, and the resource management area boundaries and intents that would result in significant changes to the allowed resource uses or to priorities will require major amendment to the Livingstone-Porcupine Hills Integrated Resource Plan. An amendment to the plan may be required as a result of an annual review, government requests or a request from an individual, group or organization outside the government. Proposed amendments to the Livingstone-Porcupine Hills Integrated Resource Plan from outside the government should be made by formal application to the Assistant Deputy Minister of the Resource Evaluation and Planning Division, Alberta Forestry, Lands and Wildlife*. Opportunities for public review of proposed amendments to the Livingstone-Porcupine Hills Integrated Resource Plan will be provided before changes are approved by the government. A decision on requests to amend an integrated resource plan will be endorsed by the Minister of Forestry, Lands and Wildlife or his designate. Amendments which entail a major policy decision or a change to the basic intent of the plan may be forwarded by the Minister to the Cabinet Committee for approval.

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*Guidelines for preparing requests for amendments to integrated plans are available upon request.

GLOSSARY

Annual Allowable Cut (AAC) — The total volume of timber that may be harvested in one year based on sustained yield.

Adventure Product — An exciting outdoor visitor experience with an overnight component that is attractive enough to draw visitors from outside the province. Examples include trail riding, fly-in fishing, white water rafting, and guest ranches.

Aggregate — Any of several hard, inert, construction materials (such as sand, gravel, crushed stone, or other mineral material) used by mixing in variously sized fragments with a cementing or bituminous material to form concrete, mortar, plaster or used alone as in railroad ballast.

Animal Unit Month — A measure of forage or feed required to maintain one animal unit (i.e. a mature cow of 455 kg [1 000 lbs] with or without an unweaned calf for a period of 30 days.

Arable Land — Land so located that production of cultivated crops is economical and practical. (Resource Conservation Glossary, 1982) Soil Conservation Society of America.

Land with a generalized site index of 24 or more according to the modified Storrie system used by the Public Lands Division.

Archaeological Resource — "...a work of man that (i) is primarily of value for its prehistoric, historic, cultural or scientific significance, and (ii) is or was buried or partially buried in land in Alberta or submerged beneath the surface of any watercourse or permanent body of water in Alberta." (Historic Resources Act, Revised statute of Alberta [henceforth abbreviated RSA], 1978, H-8).

Auto Access Camping — A formally designated camping facility that is accessible to normal vehicles from designated highways or improved roads.

Auto Touring Routes — Existing roads in the planning area which are either major travel corridors or travel through cultural or aesthetic features of sufficient significance to warrant greater visitor awareness, education and enjoyment. The

	development of suitable visitor information (e.g. interpretive brochures, road signs) and non-serviced road facilities such as pull off areas and view points is appropriate on these roadways.
Carrying Capacity (Range)	The maximum animal numbers which can graze annually on a given range for a specific period of time, without inducing a downward trend in forage production, forage quality or soil.
Commercial Development	All activities and infrastructure associated with the development of facilities for the use of the general public, including fixed-roof recreation accommodation such as hunting, fishing, skiing and backcountry lodges, hotels, motels, apartments, townhouses, cottages and commercial recreation activities involving facilities such as ski hills and golf courses, whether owned and/or operated by the private or public sectors. (A Policy for Resource Management of the Eastern Slopes Revised 1984 , glossary, ENR No. T/38)
Commercial Timber Permit	Authorizes the permittee to harvest timber and identifies land on which timber may be harvested, the period of time within which the timber may be harvested, the actual timber to be harvested and the terms and conditions on which the permit is issued. (The Forest Act RSA 1980, c. F-16)
Consumptive Use	Those uses of resources that reduce the supply--such as hunting, logging and mining (Wildlands Planning Glossary, USDA Forest Service). Conversely, non-consumptive use does not reduce the supply-- for example, wildlife viewing.
Critical Habitat	Habitat that is crucial to the size, distribution or stability of a wildlife or fish population. Loss of such habitat would result in a drastic decline or extirpation of a population.
Crown Land	Public lands held by the Crown in the right of Alberta.
Cultivation	Agricultural practices associated with the regular tillage of land for production of annual and/or forage crops.

Data Collection and Analysis	The gathering and analysis of data may be a separate step in the planning process or it may continue throughout. Participating agencies collect and analysis information on resource capability, present use, potential use, demand and current policy direction.
Dispersed Recreation	Various kinds of recreation activities that generally occur throughout a large area and are not confined to a specific place. Activities that would be associated with dispersed recreation include hiking, remote or primitive camping, hunting, fishing, horseback riding and cross-country skiing.
Domestic Grazing	All activities associated with the production and utilization of forage for domestic livestock.
Eastern Slopes Zones	The Eastern Slopes Policy document prepared originally in 1977 and revised in 1984 identifies three policy areas and eight corresponding regional land use zones: A. Protection - 1) Prime Protection, 2) Critical Wildlife, 3) Special Use; B. Resource Management - 4) General Recreation, 5) Multiple use, 6) Agriculture; C. Development - 7) Industrial, 8) Facility. The primary objects of regional zoning are: a) to provide resource management intents for broad units of land, b) to recognize opportunities and allocate resources at a broad regional scale, c) to provide background and direction for more detailed integrated resource planning, and d) as a consequence of the latter objects, to resolve land use conflicts.
Ecological Land Classification	A subdivision and classification of the and surface into areas of similar environments. The methodology is based on an inventory and analysis of vegetation, soil, landform, parent material and drainage characteristics. In the planning process, this information provides background data upon which capability evaluations of various resource uses can be made.

Ecosection	A subdivision of an ecodistrict, based upon patterns of vegetation, landform, soils and slopes.
Ecotone	An ecotone is a transition between two or more biotic communities.
Established In-Place Resource	The quantity prior to any production of a body of mineral that has been specifically delineated by drilling, trenching, driving adits, mine development or other exploratory work, and including some judged to exist contiguously on the basis of geological, seismic or similar information.
Established Recoverable Reserves	Those reserves that are recoverable using existing technology under present and anticipated economic conditions. (Alberta Energy Portfolio, Oil Sands, glossary, ENR)
Extensive Recreation	The recreational use of trails, natural lakes, rivers, streams and generally undeveloped or minimally developed areas. The term includes such activities as hiking, backpacking, hunting, fishing, snowmobiling, horseback riding and cross-country skiing. (Wildland Planning Glossary, USDA Forest Service)
Fixed Roof Accommodation	Permanent accommodation other than campgrounds. Examples include hotels, motels, backcountry lodges, and rental cabins.
Forage	All browse and non-woody plants that are available to livestock or game animals and use for grazing or harvested for feeding. (Wildland Planning Glossary, Soil Cons. Soc. Amer. 1970)
Forest Land Base	Land considered to be capable of contributing to the social and economic welfare of the province if it is predominantly maintained under forest management. Includes provisions for production of wood and wood products on a sustained yield basis, wildlife, grazing, recreation, and protection and production of water supplies.
Forest Land Use Zone	A zone established by order-in-council allowing the Alberta Forest Service to establish land use restrictions. Forest Land Use Zones are normally used to control recreational activities.

Forest Management Unit	The forested region of the province is divided into 10 forests for administrative and management purposes. These forests in turn are divided into sub-units called FMUs which are managed as separate entities on a sustained yield basis. FMUs are controlled by a management plan which includes such information as growing stock, allowable cuts and a timber harvest development program. FMUs are managed to allow periodic cutting of timber volumes without disturbing the balance between forest growth and depletion or impairing the maintenance of the forest in perpetuity.
Freehold Mineral Rights	Those mineral rights owned by a party other than the Crown in the right of Alberta.
Glacio-fluvial	Relating to streams flowing from glaciers or to the deposits of such streams.
Grazing Allotment	Synonymous with range allotment, meaning a rangeland area based on natural or watershed boundaries designated for the use of a prescribed number of cattle, managed by a permittee(s) and directed by a range management plan prepared by the Alberta Forest Service.
Grazing Lease	A Crown grazing land disposition issued on an area of land which has the suitability to support Livestock. Leases are legislated under The Public Lands Act RSA 1980, P-30 and are issued for Crown lands in the Green Area and White Area, outside the Rocky Mountain Forest Reserve, usually for a term of five or 10 years. The lease allows the lessee exclusive grazing use of the land.
Green Area	The Green Area, established in 1948 by Order-in-Council 113/48, consists basically of the non-settled forest lands and covers 50.9 per cent of the total area of the Province of Alberta. Public lands in the Green Area managed primarily for forest production, watershed protection, fish and wildlife management, recreation and other multiple uses. Permanent settlement, except on legally sub-divided lands, as well as agricultural uses other than grazing, have been excluded. (Alberta Public Lands, Alberta Energy and Natural Resources)

Historic Resource Impact Assessment (HRIA)	Projects normally instituted in conjunction with Assessment development programs which are anticipated to cause ground surface disturbance within Alberta. The object of such projects is to locate all historical resource sites to be affected by the development program, to evaluate the worth of such sites relative to Alberta historical resources as a whole, to determine the nature of the impact of the development program on individual sites, and to propose conservation procedures for those sites to be affected by the development.
Historic Resource	Any work of nature or of man that is primarily of value for its paleontological, archaeological, prehistoric, historic, cultural, natural, scientific or aesthetic interest including, but not limited to, a palaeontological, archaeological prehistoric, historic or natural site, structure or object. (Alberta Culture)
Historic Site	Any site which includes or comprises a historical resource of an immovable nature or which cannot be associated from its context without destroying some or all of its value as an historical resource and includes a prehistoric, historic or natural site or structure. (Alberta Culture)
Improved Grazing	Grazing lands which have had productivity enhanced by clearing and the establishment of tame forage stands and/or various range maintenance projects such as brush regrowth control, crossfencing, drainage, etc.
Integrated Resource Planning	A cooperative and comprehensive approach to decision-making on resource uses. Integrated resource planning encourages everyone concerned to help decide the best use and management of public lands and resources. Planning identifies opportunities for resource use and resolves conflicts -- information is collected and analyzed, several options for resource use are developed, and a choice is made. This choice directs resource management in the planning area. Integrated resource planning is one part of integrated resource management.
Intensive Recreation	High density recreational activities oriented towards developed facilities; for example, campgrounds, day-use areas, day use trail networks and off-highway vehicle areas.

(Wildland Planning Glossary, USDA Forest Service)

Local Timber Permit (LTP)

A timber permit issued normally to local residents authorizing the cutting of coniferous or deciduous timber for volumes up to a maximum of 750 m^3 coniferous or 1 500 m^3 deciduous and expiring April 30 of any year.

Logging

All activities associated with the removal and transport of timber for manufacture into forest products. (A Policy for Resource Management of the Eastern Slopes Revised 1984, glossary, ENR No. T/38).

Metallic Minerals

All minerals other than coal, petroleum, natural gas, oil sands, quarriable minerals, sand, gravel, clay and marl. This includes, but is not restricted to, gold, silver, uranium, platinum, copper, iron, tin, zinc, and asbestos.

Minerals

All naturally occurring minerals. This includes petroleum, natural gas, coal, oil sands, quarriable minerals, metallic minerals, sand, gravel, clay and marl.

Mineral Exploration

Those activities that are associated with the discovery and assessment of mineral resources (e.g. test drilling and geophysical assessments).

Mineral Development

All activities and infrastructure associated with recovery, processing, upgrading or refining of mineral resources.

Miscellaneous Timber Use

Timber made available for use by local residents under Local Timber Permits, which are issued without competition.

Motorized Recreation

All recreational activities that involve or require the use of motorized equipment.

Multiple Use

The use of land for more than one purpose (e.g. watershed management, timber production, domestic livestock grazing, wildlife production, recreation and industrial uses). A combination of uses may not necessarily yield the highest economic return or the greatest unit output considering the optimal use of available

resources (Adapted from Resource Conservation Glossary, 3rd Edition. Soil Conservation Society of America).

Natural Areas

Natural areas are parcels of land set aside for conservation purposes, primarily in the White Area of Alberta. The designation and protection of such areas is consistent with similar programs throughout the world. Recreational Natural Areas are for outdoor recreational purposes, especially non-mechanized forms such as canoeing, snowshoeing, hiking and nature photography.
Administration of Alberta's Natural Area system is the responsibility of the Public Lands Division assisted by the interdepartmental Natural Areas committee.

Off-Highway Vehicle

A motorized vehicle used for cross-country travel on land, water or snow including four-wheel drive vehicles, motorcycles, track vehicles and snow vehicles, but does not include motor boats. (The Off-Highway Vehicle Act, RSA 1980, c-0-4)

Off-Highway Vehicle Activity

Winter and summer mechanical transportation used to traverse any area not designated as a highway or improved roadway.

Operational Plans

Provincial government resource management agencies prepare long- and short-range plans for the management of resources under their jurisdiction. These specific resource management plans generally deal exclusively with the resource(s) for which a management responsibility has been delegated. Wildlife management plans, timber management plans, range management plans and recreation management plans are examples.

Palaeontological Resource

A work of nature consisting of or containing evidence of extinct multicellular beings and includes those works or classes of works of nature designated by the regulations as palaeontological resources. (Alberta Culture)

Primary Industry

An industry engaged in the harvesting or extraction of resources such as agricultural products, oil, natural gas, coal, timber, sand, gravel and clay. It also includes an industry engaged primarily in bringing one or more of these materials together with other elements

	such as water or power into an integrated process for the purpose of primary treatment of the materials to a raw marketable form. It does not include an industry which uses the processed raw materials as an input to its industrial process.
Primary Range	An area which animals prefer to use and over which they will graze when management is limited (Wildland Planning Glossary, USDA Forest Service). The primary range will be overused before secondary range is used when animals are allowed to shift for themselves (Glossary of Terms, Society for Range Management).
Primitive Camping	A designated camping area with minimal services and non-mechanized access.
Public Land	Land of the Crown in right of Alberta. All public land is under the administration of the Minister of Forestry, Lands and Wildlife, except that public land that is, by virtue of any other Act or an order of the Lieutenant Governor-in-Council, under the administration of another Minister of the Crown or of a Crown corporation. The title to the beds and shores of all rivers, streams, watercourses, lakes and other bodies of water is declared to be vested in the Crown in right of Alberta and under the administration of the Minister of Forestry, Lands and Wildlife.
Quarriable Minerals	A mineral that can be quarried and used in its natural state for building, construction, industrial, manufacturing or agricultural purposes including (without limitation) anhydride, bentonite, diatomite, gypsum, granite, limestone, marble, mica, potash, quartz rock, rock phosphate, sandstone, shale, slate, talc or volcanic ash.
Quota	Quotas convey coniferous timber rights expressed as a percent shared of the annual allowable cut for a given FMU. Quotas are used to allocate commercial quantities of timber within specified areas to individual companies and have a 20-year term.
Random Camping	An undesignated area used for camping that is accessible by any means.

Rangeland	Land on which the (climax or natural potential) plant community is dominated by grasses, grass-like plants, forbs or shrubs suitable for grazing or browsing and present in sufficient quanitity to justify grazing or browsing use.
Reclamation	Post-disturbance modification of the landscape to a desired state. This usually entails maintaining a productive and balanced ecological state that is resistant to environmental deterioration and is consistent with aesthetic values.
Regional Resource Management Committee (RRMC)	A group of regional directors representing each of the involved divisions of Alberta Forestry, Lands and Wildlife and other agency representatives on an occasional and as needs basis. The RRMC reviews planning documents and has primary responsibility for the implementation stage of the planning process.
Residential Subdivisions	All activities and infrastructure associated with permanent-housing subdivisions for residents. (A Policy for Resource Management of the Eastern Slopes Revised, 1984, glossary, ENR No. t/38)
Resource Management Area	A geographical unit which has a common resource management intent (e.g., wildlife habitat protection, multiple use, extensive or intensive recreation).
Resource Management Guidelines	A framework within which to resolve potential conflicts between resource management objectives and to implement resource management and objectives identified in an integrated resource plan. Resource Management Guidelines can prescribe or define: a) conditions, requirements or standards which may be imposed upon those activities which have a direct or indirect effect on resources or resource uses; b) information collection activities and responsibilities; c) decision-making activities and responsibilities; and d) procedures for making decisions about activities.
Resoure Management Objectives	A frame of reference that provides a degree of measure in reaching designated goals. More specifically, resource management objectives: a) document desired conditions that spell out ends rather than means;

b) are cast as infinitives rather than in the imperative or future tense;
c) are presented in a hierarchial fashion which demonstrates continuity in detail; and
d) are quantifiable and can be achieved with existing technology or knowledge.

Resource Opportunities — Potential for future use of the resource.

Riparian — Pertaining to, or situated on, the bank of a river, lake or stream.

Salvage Cutting — A cutting made to use dead, downed and injured trees before the timber becomes unmerchantable.

Sanitation Cutting — A cutting made to remove dead, diseased, infested, damaged or susceptible trees to reduce or prevent the spread of insects or pathogens.

Secondary Industry — An activity enganged in the manufacturing, processing, assembling, warehousing or servicing function.

Secondary Range — An area which is unused or lightly used by livestock under minimal management and will ordinarily not be fully used until the primary range has been overused. (Wildlife Planning Glossary, USDA Forest Service)

Selective Logging/ Cutting — Removal of mature timeber, usually the oldest or largest trees, either as single scattered trees or small groups at relatively short intervals, commonly five to 20 years, repeated indefinitely, by means of which the continuous establishment of natural reproduction is encouraged and an uneven-age stand is maintained. (Ford-Robertson 1971) (Wildland Planning Glossary)

Serviced Camping — A major designated camping facility which is directly accessible by designated road or improved road and which provides significant services such as electricity and pressurized water systems. (A Policy for Resource Management of the Eastern Slopes Revised 1984, glossary, ENR No. T/38)

Surface Disturbance — Because historical resources generally exist on the surface or are shallowly buried in the upper components of the soil horizon, surface disturbance can include any mechanical activity

	that affects the distribution of near-surface or buried sediments. In the case of open prairie, even extensive vehicular activity over the surface is considered disturbance. In the case of forested conditions, any activity that displaces soil horizons immediately below forest litter or deeper is considered surface disturbance. In the case of a significant known historical resource containing stratified or layered occupations, compaction of sediments as a result of heavy vehicular activity is considered disturbance (Archaeological Survey of Alberta).
Sustained Yield	The yield that a forest can produce continuously at a given intensity of management without impairment of the productivity of the land. Sustained yield timber management therefore implies continuous production of timber planned so that at the earliest practical time there is a balance between timber growth and cutting. (Wildland Planning Glossary, USDA Forest Service)
Step-out Well	A proposed well that falls within the Prime Protection Zone (Zone 1) and that, in the opinion of the Mineral Resources Division, Alberta Energy (based on geophysical, geological or engineering technical data), has a reasonable chance of penetrating the same hydrocarbon-bearing structure discovered by a well drilled prior to July 1977.
Terms of Reference	Document which outlines the framework within which the plan will develop, the purpose of the plan, the planning area, agency concerns and issues, the decision-making process, data requirements and guidelines.
Timber Quota (Coniferous)	A percentage of the volume of the annual allowable cut as it relates to coniferous that a quota holder may harvest.
Tonne	A metric measure of mass - equal to approximately 2 205 pounds.
Trail	A travel-way for motorized or non-motorized use that has an evident tread (in summer).

Tourism	The action and activities of people taking trips to places outside their home communities for any purpose except daily commuting to and from work.
Tourism Attraction	A physical feature of interest or significance which can either be natural or man-made. There may or may not be facilities constructed in conjunction with it to increase the enjoyment by visitors. The attraction can be of international, national, provincial, regional, or local significance depending upon the degree of market appeal.
Tourism Facility	A man-made development whose purpose is to offer or enhance a particular service or recreational activity to the tourist. Examples include restaurants, gas stations, information centres, hotels, ski developments, boat launches, and staging areas.
Tourism Industry	The businesses, organizations, labour, and government agencies which totally or in part provide the means of transport, goods, services, accommodations, and other facilities, programs, and resources for travel.
Trapping	Sustained-yield harvest of fur-bearing animals for commercial production of merchantable fur and for management purposes. (A Policy for Resource Management of the Eastern Slopes, Revised 1984, glossary, ENR No. T/38)
Watershed	The area contained within a drainage divide above a specified point on a stream.
White Area	The White Area is the region of the province settled initially and includes nearly one-third of the total area of Alberta. Available public lands in this region, suitable for settlement and agriculture and not required for conservation, recreational uses, wildlife habitat, for example, may be applied for, pursuant to The Public Lands Act, RSA 1980, P-30.
Wildland Recreation	Describes in relative terms extensive recreation occurring on lands that are on the less used and less altered side of a continuum from totally developed to completely untouched lands. The term is not exact in that the land may be under a low level of management for several land uses and is therefore not truly wild.

Wildlife	Big game, gamebirds, birds of prey, fur-bearing animals, fur-bearing carnivores and any other species of vertebrates designated as wildlife by legislation.
Wildlife Depredation	Use of lands and/or land products by wildlife for their survival which is in direct competition with a proposed or existing land use. Examples include wildlife use of agricultural crops, hay stacks and domestic livestock ranges.

LIST OF REFERENCES

Alberta. Energy and Natural Resources. 1976. A Coal Development Policy for Alberta. Edmonton.

-------. Energy and Natural Resources. 1977. Timber Harvest Cutblock Design Manual. ENR Report No. 43. Edmonton.

-------. Energy and Natural Resources. 1979. Ecological Land Classification and Evaluation: Livingstone-Porcupine. Prepared by W.L. Strong. ENR Report No. 94. Edmonton.

-------. Energy and Natural Resources. 1980. Terms of Reference: Livingstone-Porcupine Hills Integrated Management Plan, Revised. Resource Planning Branch, Resource Evaluation and Planning Division. Edmonton.

-------. Energy and Natural Resources. 1981. Internal Referrals Systems of Alberta Energy and Natural Resources: Report of the Task Force. Internal report Dept/10. Resource Evaluation and Planning Division. Edmonton.

-------. Energy and Natural Resources. 1984. Livingstone-Porcupine Hills Sub-Regional Plan: Resource Management Policy. Resource Planning Branch, Resource Evaluation Division. Edmonton.

-------. Energy and Natural Resources. 1984a. A Policy for Resource Management of the Eastern Slopes: Revised 1984. Edmonton.

-------. Energy Resource Conservation Board. 1986. Reserves of Coal: Province of Alberta. ERCB Report ST 87-31. Calgary.

-------. Energy Resources Conservation Board. 1985. Alberta Reserves of Crude Oil, Oil Sands, Gas, Natural Gas Liquids and Sulphur. ERCB Report ST 86-18. Calgary.

-------. Energy Resources Conservation Board. 1985. Reserves of Coal: Province of Alberta. ERCB Report ST 86-31. Calgary.

-------. Energy Resources Conservation Board. Undated. Coal Mine Atlas: Operating and Abandoned Coal Mines in Alberta. ERCB Report 85-45. Calgary.

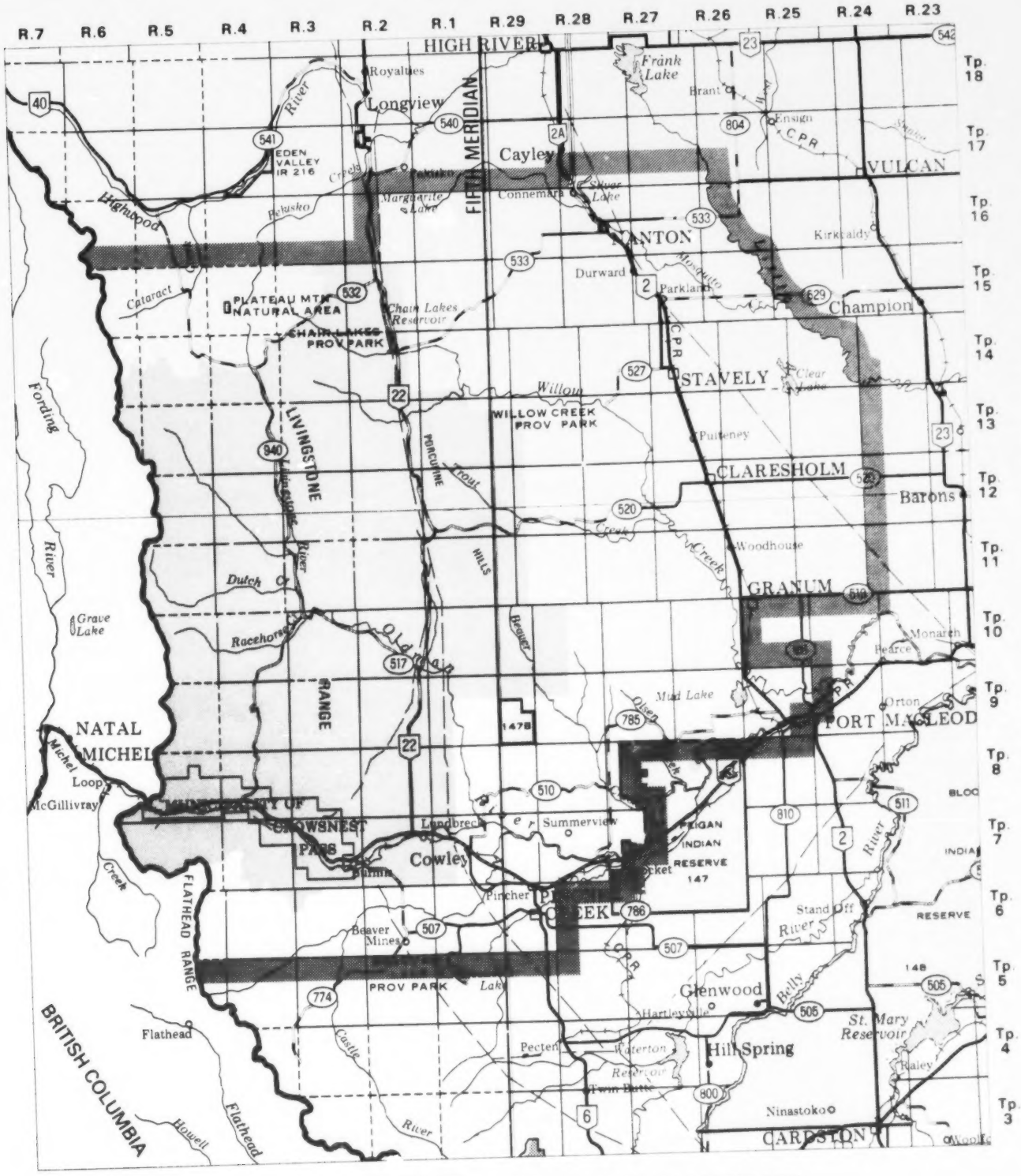
-------. Forestry, Lands and Wildlife. 1986. Forest Landscape Management Guidelines for Alberta. FLW Publication T125. Edmonton.

-------. Tourism and Small Business. 1980. "Tourism Alternatives for southwest Alberta". Unpublished report prepared by MTB Consultants Ltd. Edmonton.

Alley, N.F. 1973. Glacial Stratigraphy and the Limits of the Rocky Mountain and Laurentide Ice Sheets in Southwestern Alberta, Canada. Bulletin of Canadian Petroleum Geology. 21(2) June 1973: 153-177.

"Gas Processing Plant Capacities", Oilweek Supplement, Oilweek. January 16, 1984.

Tourism Canada. Undated. Tourism Tomorrow: Toward a Canadian Tourism Strategy. Department of Regional Industrial Expansion. Ottawa.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Royalties
Longview
Cayley
VULCAN
Frank Lake
Brant
Ensign
CPR
Connemara
Silver Lake
Kirkcaldy
Durward
Parkland
Champion
STAVELY
Pulteney
CLARESHOLM
Barons
Woodhouse
GRANUM
Monarch
Hearce
Orton
PORT MACLEOD
Mud Lake
Summerview
Cowley
Pincher
Beaver Mines
Glenwood
Hillspring
St. Mary Reservoir
Ninastoko
CARDSTON
Waterton
Pecten
Twin Butte
Hartley
Raley
Stand Off
Belly River
Castle River
Howell
Flathead
Flathead Range
Michel
Loop
McGillivray
Grave Lake
Racehorse
Dutch
Fording River
Highwood
Cataract
Pekisko
Willow
Porcupine Hills
Livingstone Range
Livingstone River
Porcupine Trout
Mud
Oldman
Beaver
Chain Lakes Reservoir
Prov Park
Plateau Mtn Natural Area
Eden Valley IR 216
Peigan Indian Reserve 147
Blood Indian Reserve
Fifth Meridian
Crowsnest Pass
Prov Park
Lake
Creek
River
Fording
Highwood
Cataract
Pekisko
Willow
Porcupine
Trout
Dutch
Racehorse
Mud
Oldman
Beaver
Castle
Howell
Flathead
Michel
Loop
McGillivray
Grave
Stand Off
Belly
St. Mary
Reservoir
Twin Butte
Reservoir
Lake
Creek
Range
Hills
Flathead
Prov Park
Natural Area
Reserve
Indian
Peigan
Blood
Fifth Meridian
CPR
Monarch
Hearce
Orton
Raley
Hartley
Pecten
Waterton
Twin Butte
Ninastoko
Woodhouse
Pulteney
Parkland
Durward
Kirkcaldy
Ensign
Brant
Frank Lake
Connemara
Silver Lake
Margarite Lake
Chain Lakes Reservoir
Plateau Mtn Natural Area
Chain Lakes Prov Park
Willow Creek Prov Park
Eden Valley IR 216
Peigan Indian Reserve 147
Blood Indian Reserve
Crowsnest Pass
Prov Park
Lundbreck
Summerview
Pincher Creek
Hillspring
Glenwood
Cardston
Claresholm
Granum
Stavely
Champion
Vulcan
Cayley
Longview
Royalties
High River
Port Macleod
Natal
Michel
Crowsnest
Flathead
Beaver Mines
Barons

APPENDIX B

EMPLOYMENT ESTIMATES BY INDUSTRY FOR THE LIVINGSTONE-PORCUPINE HILLS PLANNING AREA AND REGION IN 1961, 1971 AND 1981

INDUSTRIAL SECTORS	INDUSTRIAL DIVISION	LIVINGSTONE-PORCUPINE HILLS PLANNING AREA*									Percentage of Total Labour Force		
		Male Count			Female Count			Total Count					
		1961	1971	1981	1961	1971	1981	1961	1971	1981[t]	1961	1971	1981
PRIMARY	Mines, Quarries, Oil Wells	527	650	850	4	5	40	531	655	900	17.60	22.90	21.87
	Agriculture	569	230	325	42	60	90	611	290	400	20.25	10.13	9.72
	Forestry	47	80	100	3	0	15	50	80	105	1.65	2.79	2.55
	Fishing and Trapping	0	5	0	0	0	0	0	5	0	0	0.17	0
									Sub-Total		39.5	35.99	34.14
SECONDARY	Manufacturing	221	270	320	14	45	40	235	315	355	7.78	11.01	8.63
	Construction	452	95	310	10	5	5	462	100	300	15.31	3.49	7.29
	Transportation, Communications Utilities	188	175	115	25	10	25	213	185	135	7.05	6.46	3.28
									Sub-Total		30.14	20.96	19.2
TERTIARY	Community, Business, Personnel Service	161	145	240	292	380	620	453	525	875	15.01	18.35	21.26
	Trade	198	180	280	77	95	260	275	275	545	9.11	9.61	13.24
	Finance, Insurance, Real Estate	9	5	15	14	15	110	23	20	115	0.76	0.69	2.79
	Public Administration, Defence	86	70	145	7	35	145	93	105	55	3.08	3.67	4.61
									Sub-Total		27.96	32.32	41.92
	Industry Not Applicable	--	--	30	--	00	25	--	--	50	--	--	1.21
	Industry Unspecified	51	205	55	20	100	65	71	305	125	2.35	10.66	3.03
	All Industries	2509	2110	2710	508	750	1325	3017	2860	4065	99.95	99.93	99.48
	TOTAL LABOUR FORCE							3017	2860	4115[t]			

INDUSTRIAL SECTORS	INDUSTRIAL DIVISION	LIVINGSTONE-PORCUPINE HILLS REGION**									Percentage of Total Labour Force		
		Male Count			Female Count			Total Count					
		1961	1971	1981	1961	1971	1981	1961	1971	1981[t]	1961	1971	1981
PRIMARY	Mines, Quarries, Oil Wells	239	950	1240	8	15	60	778	965	1320	10.56	12.05	13.42
	Agriculture	1374	1260	1010	120	275	260	2105	1535	1245	28.57	19.17	12.66
	Forestry	7	80	110	0	0	15	57	80	120	0.77	0.99	1.22
	Fishing and Trapping	0	5	5	0	0	5	0	5	10	0	0.06	0.10
									Sub-Total		39.9	32.27	27.4
SECONDARY	Manufacturing	134	490	625	17	145	145	386	635	760	5.24	7.93	7.73
	Construction	467	340	725	11	15	80	940	355	785	12.76	4.43	7.98
	Transportation, Communications Utilities	240	380	335	81	40	75	534	420	405	7.24	5.24	4.12
									Sub-Total		25.24	17.6	19.83
TERTIARY	Community, Business, Personnel Service	354	625	740	428	1140	1630	1235	1765	2370	16.76	22.04	24.10
	Trade	438	770	870	127	355	690	840	1125	1580	11.40	14.05	16.07
	Finance, Insurance, Real Estate	28	25	65	36	95	215	87	120	260	1.18	1.49	2.64
	Public Administration, Defence	145	210	320	18	100	245	256	310	560	3.47	3.87	5.69
									Sub-Total		32.81	41.45	48.5
	Industry Not Applicable	--	--	50	--	--	60	--	--	105	--	--	1.06
	Industry Unspecified	48	400	145	29	290	155	148	690	310	2.00	8.61	3.15
	All Industries	3474	5535	6160	875	2470	3545	7366	8005	9730	99.95	99.93	99.94
	TOTAL LABOUR FORCE							7366	8005	9830[t]			

t Random data rounding for each enumeration area by Statistics Canada results in summation discrepancies.

* As defined by 1981 Census Canada enumeration areas 051, 054, 064, 357, 401, 402, 403, 404, 407 408, 409, 410, 411, 413, 414, 415, 416, 417, 418, 419.

** As defined by 1981 Census Canada enumeration areas 007-011, 052, 053, 055, 056-061, 062, 063, 309, 311, 312, 318, 355, 356, 358-361, 362 plus the Livingstone-Porcupine Hills planning area enumeration areas.

SOURCE: 1981 Census of Canada Data Processed by The Alberta Bureau of Statistics.
1961 and 1971 Census of Canada Data Prepared by Statistics Canada.